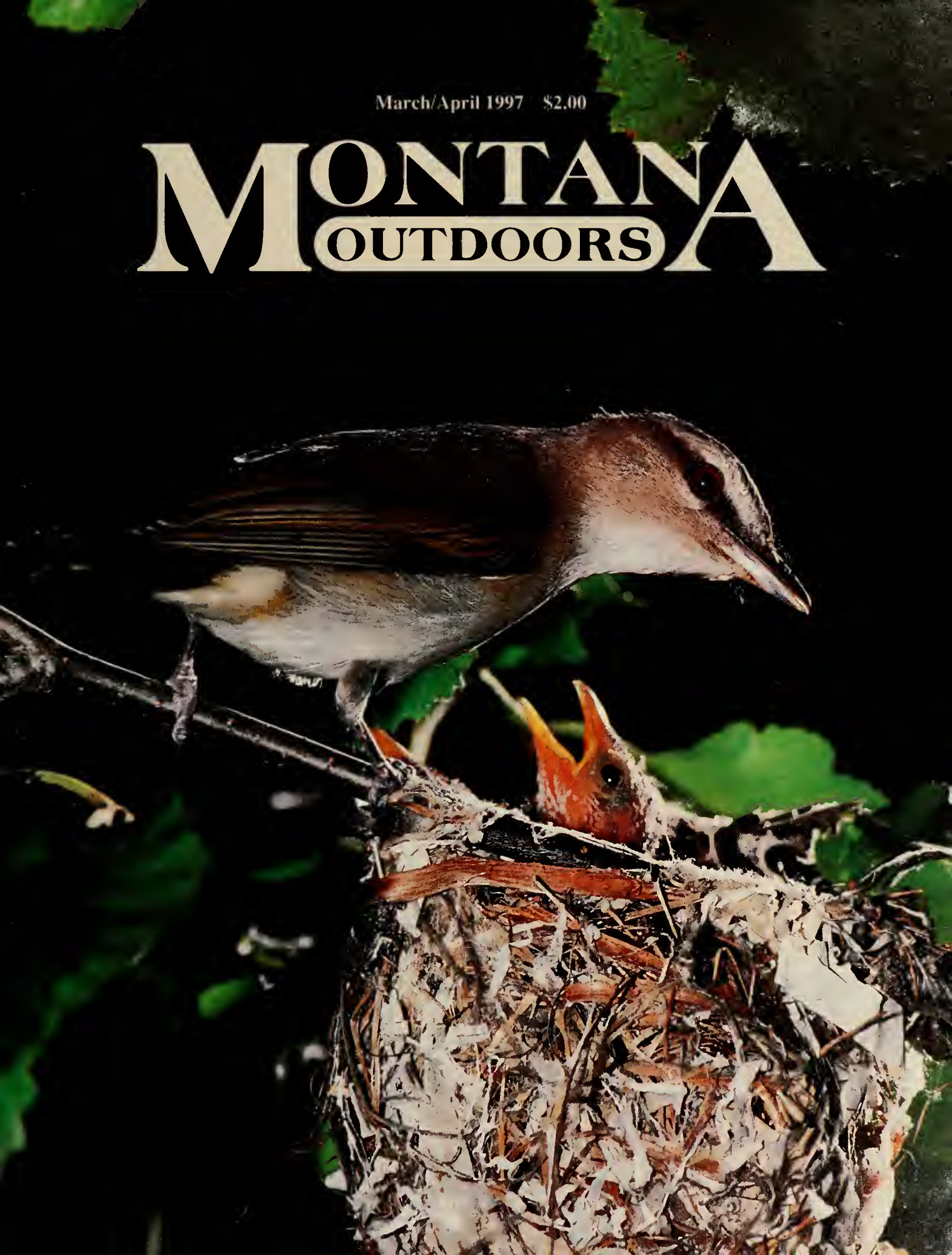
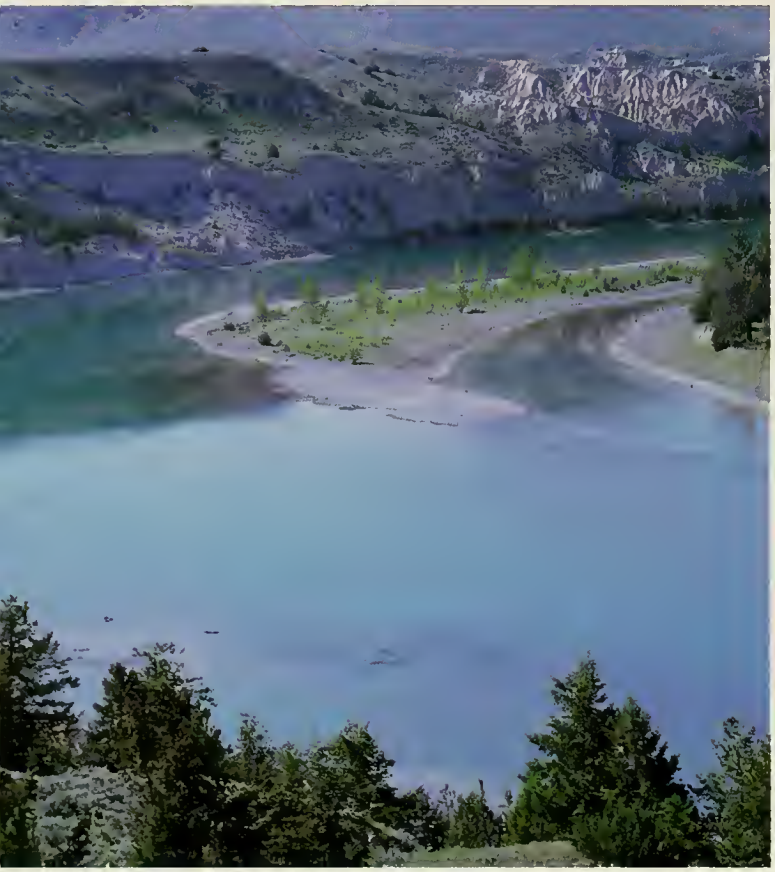
March/April 1997 $2.00

MONTANA OUTDOORS



Our Point of View



JOHN LAMBING

Governor Racicot asked me to continue as director of this department after his re-election. I accepted and wanted to share with you that it is a rare privilege to be director of one of the nation's premier fish, wildlife, and parks agencies in a state with so many natural treasures.

It's not that I didn't have reason for pause, what with whirling disease in our Madison River trout, a decline in mule deer in parts of the state, and the heavy snowfall that promised an uncertain outcome to the winter.

I looked beyond these immediate challenges to rekindle a vision for Montana's fish, wildlife, and parks. I pondered our accomplishments over the past four years, and was reminded how often I found myself amidst groups of people with very different perspectives.

When that occurred I looked for a thread that might hold these otherwise opposing groups together, the common ground. It became clear to me that what holds us together is a common desire and need to maintain our "Montana way of life." It is why we live here. It is why people move here.

If it is that simple, then why is it so hard? It is hard because we are growing more separate, rural and urban. It is hard because we each define our notion of our Montana way of life a little differently. It is hard because, as we spread out across the land, we change the land and our relation to it. It is hard because we keep bumping up against each other.

We are challenged because on the one hand we value our independence and on the other we recognize that our independence can get in our way. Our western history is built on vivid images of independence in forging a new life. Yet it was the collective will of individuals working together that built our schools, roads, and communities.

Our greatest challenge in maintaining our Montana way of life, it seems, is recognizing that our own self interest is best served by considering the interests of others and the natural community in which we live.

I am willing to give it a try if you are.

Pat

Patrick J. Graham, Director
Montana Fish, Wildlife & Parks

BILL MARCHEL

Cowbirds can often be found searching for insects kicked up by the hooves of cattle or horses (page 8).

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Montana Outdoors (ISSN 0027-0016), the official publication of Montana Fish, Wildlife & Parks, is published bimonthly (January, March, May, July, September, and November). Contributions (manuscripts or illustrations) are welcome with the understanding that the department or the editor cannot be responsible for loss or damage. All contributions will be published at the discretion of the editor. Subscription rates are $7 for one year, $12.50 for two years, and $17 for three years. (Please add $3 per year for Canadian subscriptions. All other foreign subscriptions, air mail only, are $22 for one year.) Individual copies and back issues cost $3 each (includes postage). Although ***Montana Outdoors*** is copyrighted, permission to reprint articles is available by writing our office or phoning us at 406/444-2474. All correspondence should be addressed: ***Montana Outdoors***, Montana Fish, Wildlife & Parks, 930 West Custer Ave., P.O. Box 200701; Helena, MT 59620-0701. ©Montana Fish, Wildlife & Parks, 1997. All rights reserved. Indexed by States' Periodical Index, 1660 Smithville Road; Havre, MT 59501.

Postmaster: Send address changes to ***Montana Outdoors***, Montana Fish, Wildlife & Parks, 930 West Custer Ave., P.O. Box 200701; Helena, MT 59620-0701. Preferred periodicals postage paid at Helena, MT 59620, and additional mailing offices.

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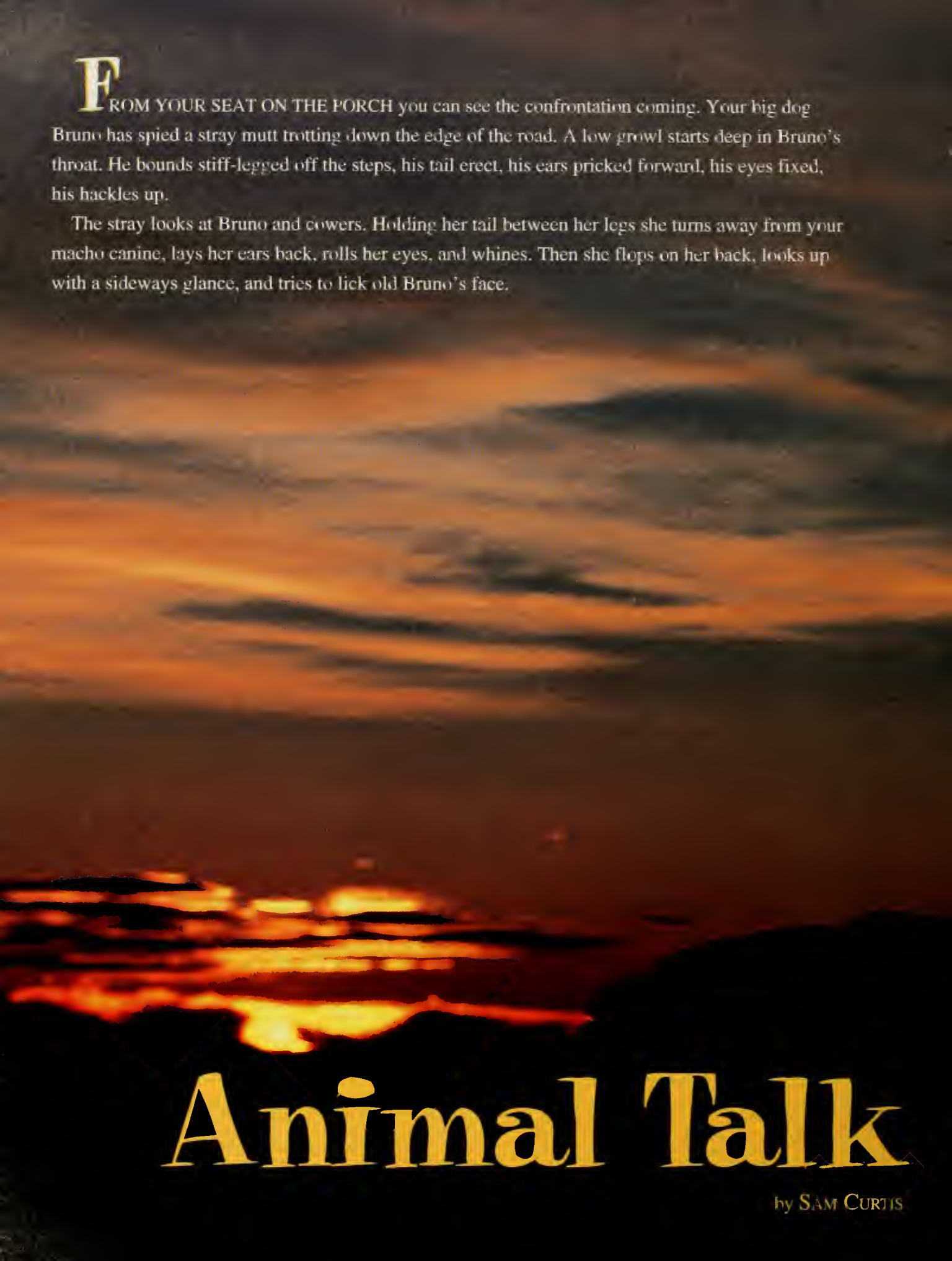


FROM YOUR SEAT ON THE PORCH you can see the confrontation coming. Your big dog Bruno has spied a stray mutt trotting down the edge of the road. A low growl starts deep in Bruno's throat. He bounds stiff-legged off the steps, his tail erect, his ears pricked forward, his eyes fixed, his hackles up.

The stray looks at Bruno and cowers. Holding her tail between her legs she turns away from your macho canine, lays her ears back, rolls her eyes, and whines. Then she flops on her back, looks up with a sideways glance, and tries to lick old Bruno's face.

Animal Talk

by SAM CURTIS

Bruno sniffs at her, gives his tail a wag, and turns away. She jumps up and races around him in circles. But Bruno just ambles over and sits back down on the porch.

You know exactly how the dialogue went between them:

"Who's coming into my yard?"

"Oh boy, here's trouble."

"You trying to take over my turf?"

"Hey, you got me wrong; I'm just passing through."

"Well, I guess you're okay. Just a young girl nosing about."

"Right, right. But look, we can still have some fun running around."

"Naw, not interested, not today."

Dog talk. It's a blend of smells, sounds, and gestures that we've learned to understand because canines have lived around us for so long.

But all animals talk. Their lives depend on it. They tell one another their sex, age, and individual identity. They show one another where to find food. They warn one another of danger. They let each other know who's the leader and who's the follower. They give directions and tell one another when they're mad or glad or hurt or feeling sexy. In short, they organize and run their private and social lives through their ability to communicate with one another within their species and occasionally with other species.

While we may understand a lot of what Bruno has to say, the talk of animals such as snails, crickets, spiders, snakes, fish, birds, and mammals is often a foreign language that only animal researchers can translate. The basis of any animal communication, of course, comes in the form of signals or codes that are sent in a number of ingenious ways. Perhaps the most basic signals are chemicals, called pheromones, which are emitted by many organisms as messages to other members of their species who then translate that information through their sense of taste or smell.

Something as simple as slime mold—half plant, half animal—which begins life as a single-celled blob of protoplasm, puts out a chemical called *acrasin* that says to others of its kind: "Let's get together and multiply."

But chemical messages can be more complicated than this. Ants use pheromones to blaze trails to food sources and to distinguish nestmates from ants of other colonies and other species. One species of raiding ant directs its members to a nest to be raided with an odor trail and then uses another pheromone to drive out the original occupants of the nest.

Some animals use pheromone communication to identify individual members of their species. The beaver's castor glands, for example, produce 50 different chemicals. The subtle variation in the blend of these pheromones is enough to spell out Tom, Dick, or Harry to the discriminating sniffer of an inquisitive beaver.

Likewise, a whitetail buck in rut uses a gland in his forehead to rub chemical messages on trees for other deer to read with their noses. This "calling card" says who he is and tells other bucks, as well as interested does, that he considers himself top buck in that neck of the woods. Clearly, there's nothing self-effacing or humble about a buck in rut.

And then there are wolves who leave strategically placed piles of scat and dribbles of urine for other wolves to read. The messages may indicate when that area was last hunted and who the individual hunters were that passed through.

A unique form of animal talk sends messages not with pheromones but with light. The lightning bug uses biochemically created flashes to blink a kind of Morse code to other lightning bugs in the vicinity. The color, timing, and number of a male's flashes tell the female what species of lightning bug he belongs to, and she blinks back a same-species message that says she's ready to mate.

This might all end in just another flashy romance if it weren't complicated by the fact that the females of a predatory species have learned to mimic the romantically inclined females and thereby lure their amorous mates to the predator's dinner table instead of his own female's bedroom.

Not to be outdone, the males of the predatory species

ERWIN & PEGGY BAUER

This whitetail buck leaves its olfactory calling card on a tree for other whitetails to interpret.

mimic the flashes of the prey species in hopes of luring one of his own females into thinking she's going to get dinner. When she arrives, the male blinks his true identity, and the female mates with her own species instead of dining on her prey. It's a classic case of "bait and switch." And it gives new meaning to the term "mixed messages."

The use of "body language" is another means of animal communication, as domestic dogs and cats have shown us. Body gestures and facial expressions are used by a variety of insects, birds, and mammals as a type of semaphore to talk to members of their species.

Honeybees, for example, perform an intricate dance for their hivemates to indicate the distance, direction, and quality of a food source that may be miles away. In what has been

TIM EGAN

RICH KIRCHNER

Honeybees (above) perform an intricate dance at the honeycomb to tell other bees about the location and quality of a nectar source. Swans, like the trumpeters at left, use their long necks in various ways to signal alarm or greeting.

termed the "waggle dance," a foraging bee, on discovering a good food supply, returns to the hive and starts dancing in squared-off figure eights on the surface of the honeycomb. In the straight run between the top and the bottom of the eight, the bee waggles its tail. The direction of the straight run points to the direction of the food in relation to the sun. The rapidity of the tail wagging tells the distance. And the vigor of the dance indicates the sweetness of the nectar.

A dance with a rhythm of four or five tail wagging runs in 15 seconds, for example, tells other bees in the hive that the food is about 1,000 yards away. When this tail wag is danced straight up the face of the honeycomb, it indicates the direction of the food is straight toward the sun. If the dance's straight run is made at a 30-degree angle to the left of vertical, the bees need to fly 30 degrees to the left of the sun to find the food. In the darkness of the hive, bees may crowd around returning foragers feeling their dance with their antennae to get the latest news on exactly where to find nectar.

Birds, too, use body language. In the case of geese or swans, what better body part to signal messages with than their necks? Alarmed swans hold their necks straight up. And although this posture may simply be an attempt to see possible danger, other swans have learned to read it as a warning sign. Researchers have also noticed that swans and geese often greet each other with "the motion of sipping

MICHAEL H FRANCIS

Cow elk tell their newborn calves to seek cover or come out of hiding with distinct barks or neighs.

water, in much the same way that men drink together, not to slake their thirst but as a sign of friendship."

Wolves, like dogs, are masters of body language and use it to express social etiquette as well as status within the pack. Facial features play a large part in their communication; they use ears, eyes, lips, and tongue to talk to one another. Wolves poke with their noses, mouth each others' muzzles, rub cheeks, lick, twitch ears, and stare to get their point across.

However, in his book *Of Wolves and Men*, Barry Lopez says: "It should be borne in mind that there are misunderstandings among wolves, just as there are in human relationships, and observers occasionally glimpse amazement on the face of a wolf who catches an intimidating look meant for someone else."

Elk are as gregarious as wolves in their dealings with one another; to keep peace within the herd, subordinate animals

indicate their submission to dominant animals, whether male or female, by posture. When approached by a dominant herd member a subordinate depresses its neck and head, lowers its ears, and assumes a slight crouch while opening and closing its mouth in a ritual gesture of feeding that says, "No aggression intended here; I'm just interested in food."

Along with body language, elk use vocalization to aid in communication. A cow tells her newborn calf to dive for cover with a distinct bark that may also bring her yearling calves crowding around her in alarm. When danger has gone, the calf is called out of hiding by the cow's high-pitched neigh.

In the case of white-tailed deer, researchers have identified a vocabulary of 12 vocal sounds, including bleats, bawls, grunts, snorts, and wheezes in various combinations. Perhaps the whitetail talk best known to hunters is their explosive snort combined with a foot stomp that says: "There's something fishy out there; I'm not sure what it is, but I'm thinking of getting the heck out of here."

Birds have a vocal language that is quite amazing in its influence on their lives. Geese learn to recognize their mother's voice even before they are hatched because of the goose's habit of "talking" to her eggs as she sits on the nest. So, goslings know exactly who mom is the minute they crack into the world.

At least they think they do. To test the theory of voice recognition in newly hatched ducks, researchers put a recording of a mother duck's assembly call inside a red-and-white striped box. When the call was played to the day-old ducklings, they scampered to the box just as readily as they flocked to their mother's call when it actually came from her.

One of the most vocal and articulate mammals to voice its concerns is the ground squirrel. Scott Robinson of the University of Wisconsin found that these critters use chirps of varying pitch and loudness to distinguish danger from flying, walking, or slithering predators. Their calls even indicate the degree of danger posed by the specific whereabouts of different enemies.

Of course, all creatures that sound off don't necessarily vocalize. Insects can create an uproarious din by rubbing together various body parts. Grasshoppers and locusts, for instance, have spiny projections on their legs much like the teeth on a saw. When the tough part of the wing is scraped across these spurs, like a bow across a fiddle's strings, it becomes more than music to their ears. It's hopper talk.

Animal language researcher Dr. Abraham Moles studied the six different chirps of a male grasshopper and came up with an interesting translation of their talk. The chirps, he claims, say something like this: "It is fine; life is good." "I would like to make love." "You are trespassing on my territory." "She's mine!" "Oh how nice it would be to make love." "How nice to have made love."

Oh, those hoppers!

Although most communication is carried on among animals of the same species, there are instances of one species learning at least some of the language of another species. One moth species has learned to translate the talk of its arch enemy, the bat.

Investigation into this ability in moths was set in motion one summer evening when Kenneth Roeder, a physiology professor at Tufts University, was throwing a party on his lawn. When one of his friends casually rubbed a wet finger around the rim of his glass, making it ring, all the moths circling an outside lantern immediately fell to the ground, only to flutter into the air again seconds later.

What Roeder and his colleagues discovered, after much investigation, was that the moths had interpreted the ultrasonic sound of the rubbed glass to be the sound made by a bat in its attempt to locate them by echolocation. Over millennia of evolution, these moths have developed sensory nerves that trigger alarm impulses to their brain when they pick up "bat talk." One set of nerve cells acts as an early warning system, alerting the moth that danger is possible and evasive action is advisable. Another set of nerves sets off a panic button that indicates a bat attack is imminent, causing the moth to collapse its wings and fall to the ground to avoid disaster. A third set of nerves has been found in these moths, but researchers have not yet discovered its role.

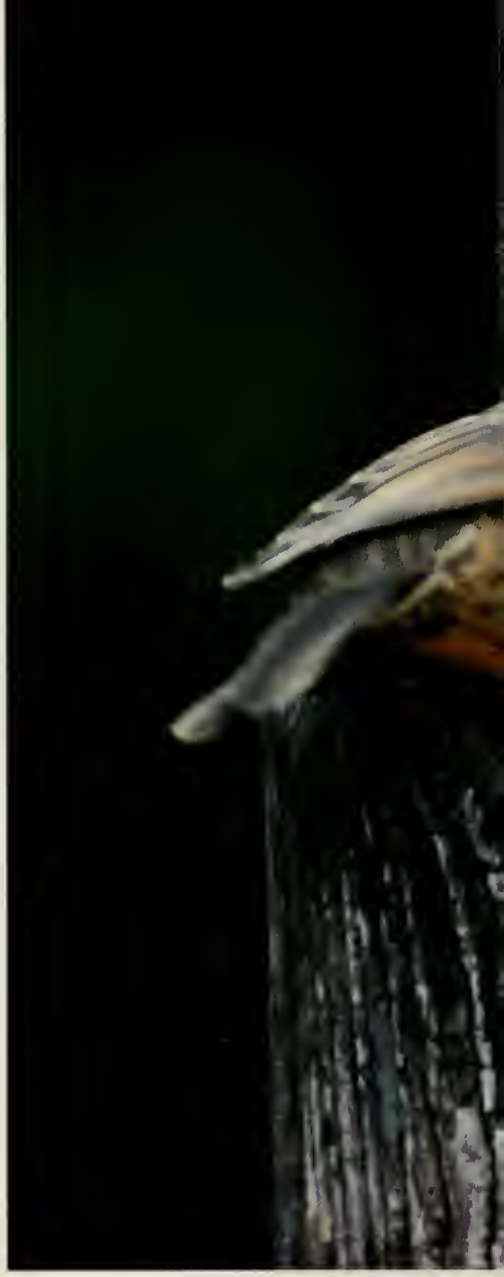
As Roeder's story suggests, there are many new discoveries in the field of animal communication that are waiting to be uncovered. There may be subtleties in the methods of animal talk that we have yet to imagine. And, as Barry Lopez suggests in *Of Wolves and Men*, we may yet find surprises in the ways of animal language that we already think we understand:

"Our attempts to understand wolf language are crude and based not a little on the belief that the animal is simple-minded and therefore speaks a simple language. There are sounds we can't hear and there are signals we don't see. As we begin to put vocalization together with more fluid and careful descriptions of body movement, we are bound to discover considerably more about the wolf and his language of gesture."

Just imagine what old Bruno might have said to that stray. And right before your very eyes! ■

Brown-headed cowbird.

BILL MARCHEL



WATCHABLE WILDLIFE

Tracking Down an Avian Trickster

by CHRISTINE PAIGE

PAUSE FOR A FEW MINUTES in the shade of a riverside woodland and you will no doubt glimpse warblers, redstarts, vireos, flycatchers, and dozens of other feathered jewels flashing through the leaves. Across the West's arid landscapes, the dense patches of willow and towering glades of cottonwood along rivers and streams are magnets for songbirds, offering an abundance of nesting places and an overflowing larder of insect prey. More than 60% of all western songbirds depend on streamside habitats to nest, and each summer the cottonwoods and willows teem with birds intent on raising a brood of youngsters in the few brief weeks before autumn sends them winging south again.

In truth, the richness of these woodlands can be deceptive. Sometimes it takes an ecological detective, or a whole army of them, to dig beyond the peace of a summer morning filled with birdsong and uncover the trouble brewing. Josh Tewksbury, an energetic graduate student at the University of Montana, is leading a small troop of field assistants to snoop into the secret lives of streamside birds.

Bitterroot Birds, Riparian Riddles

By 5:00 a.m. at the Bitterroot Riparian Bird Project field station, a hodgepodge gypsy camp of tents and trailers just a stone's throw from the Bitterroot River, the day is already well underway. Even at this hour in the one-room cabin that serves as camp office (the windows empty of panes and the low-slung lintel padded with bubble-packing and duct tape) the project's computer terminals glow and a printer whines. The last go-cup of coffee is poured in the communal kitchen as the biologists and field assistants gather up binoculars, hip boots, and data sheets. Still yawning, they slip off into the early shadows, dispersing by truck and foot among 16 study sites along the river and nearby streams.

Tewksbury is attempting to piece together a picture of the bird communi-

DONALD M. JONES

Programmed by instinct, a diminutive yellow-rumped warbler feeds a rapidly growing cowbird. When a female cowbird sneaks an egg into the nest of another bird, the job of rearing the young is left to the unsuspecting host. Because the cowbird chick hatches sooner and grows faster than its nestmates, it often outcompetes them for food and attention.

ties in two major riparian types: the cottonwood "gallery" forests along the Bitterroot River, and the streamside woodlands of willow, alder, and aspen in the nearby foothills. On study sites along the Bitterroot River and on every drainage in a 20-mile section of the Bitterroot Front, the crews census birds, collect data on the vegetation in each habitat, and track the success of nests. What they're finding is that many songbirds have a tough time successfully raising chicks because of a sneaky trickster in the neighborhood.

An Avian Interloper

In the soft morning light, two of Tewksbury's assistants, Dan Cariveau and Wajid Jenkins, lug an aluminum ladder through high willows and across a quiet stream. Placing the ladder against a tall willow, Jenkins scrambles up 15 feet or so and quickly checks a yellow warbler nest. The female warbler flits from branch to branch nearby, scolding this enormous intruder. "One cowbird egg, three yellow eggs!" Jenkins hollers from the quivering branches, and then retreats down the ladder. This nest, and many like it throughout the study sites, has been parasitized by a brown-headed cowbird.

The cowbird is a "brood parasite" that lays its eggs in other birds' nests for the host birds to raise, much like a

Below: *An American redstart nest is parasitized with two large, speckled cowbird eggs. Many host birds don't recognize the difference between their own eggs and the larger cowbird eggs.* ***Right:*** *Wajid Jenkins, a field assistant on the Bitterroot Riparian Bird Project, checks the status of a nest. The study is assessing the impacts of cowbirds on other songbirds in the Bitterroot Valley.* ***Opposite page:*** *Cowbirds feed on insects stirred up by hoofed animals. They can be spotted perched on the backs of cows and horses, or a native ungulate—such as this bighorn sheep.*

ALISON BANKS

CHRIS PAIGE

baby left on a doorstep. The female cowbird is a superb sneak, surreptitiously spying on hosts as they construct a nest. She will slip her egg into the nest just as the hosts begin to lay their own. For the host, there's just one problem with this trick: many birds have trouble raising both the cowbird and their own young. Since the cowbird's incubation period is just a day or two shorter than the host's, the cowbird chick hatches first. Doubling its body mass each day, the cowbird nestling soon dominates its nest-mates. The adult hosts, programmed by instinct to respond to the largest gaping mouth and loudest hungry chirp, usually don't detect the difference between the cowbird chick and their own young. The hosts work madly to feed the cowbird, often overlooking their own smaller nestlings, and the larger cowbird wins out.

Cowbirds can be found virtually anywhere there is livestock, searching for insects kicked up by the hooves of grazing cattle, and chattering with a musical gurgle around horse corrals. At night, cowbirds roost in trees and shrubs, sometimes alone or in small groups, and sometimes in a mob that includes starlings and blackbirds. With first light, the females fly off to nearby forest edges and spend much of their morning snooping on host birds for clues of nest building and egg laying.

Tewksbury and his team want to understand which host species are heavily parasitized by cowbirds and why. How does the surrounding landscape influence the cowbirds' activities? Are some birds losing out to cowbirds? Alison Banks, another graduate student working on the same sites, is seeking clues in the hosts' behavior that might explain differences in parasitism rates.

Bison Birds

Originally limited to the shortgrass prairies of the Great Plains, the brown-headed cowbird once followed the great bison herds, feeding on insects stirred up by the grazing ungulates. The females would search out host nests in copses of shrubs and trees scattered across the plains. By laying its eggs in other species' nests, the cowbird was freed from the need to stay in one place through the breeding season and instead could follow the wandering bison. Biologists speculate that the pressure of cowbird parasitism on a bird community may have waxed and waned from year to year with the movement of bison. Within the cowbird's historic range, many hosts adapted behaviors to cope with parasitism, learning to reject the cowbird eggs or quickly renest when parasitized. But with the European settlement of North America the cowbird's range and numbers exploded.

As eastern woodlands were cleared for agriculture, pastures, and eventually residential development, the resulting mosaic of open fields mixed with patches of forest became ideal cowbird

DONALD M. JONES

habitat. "Cowbirds were in the East very early," says Tewksbury, "but probably not in high numbers until fairly recently." Then as rice farming expanded in the South, wintering flocks found banquets of waste grain. No longer limited by winter survival, the cowbird population boomed.

Likewise, the cowbird spread west following livestock and agriculture, first into southern California and then up the coast. Virtually unknown in the Sierra Nevada Mountains in the 1940s, by the 1970s cowbirds were a common sight feeding around pack stations and corrals. "The valleys in the Intermountain West were one of the last places cowbirds colonized," says Erick Greene, professor of biology at the University of Montana. Greene speculates that as population numbers built in surrounding areas on the Great Plains and up the West Coast, they eventually spilled into the intermountain valleys. Their move into western Montana was documented by four decades of ornithology classes led by Phil Wright and Dick Hutto of the University of Montana. From the 1940s through the 1960s, classes rarely recorded cowbirds on trips up the Bitterroot Valley, but in the late 1970s and 1980s cowbird numbers erupted.

Cowbird Threats

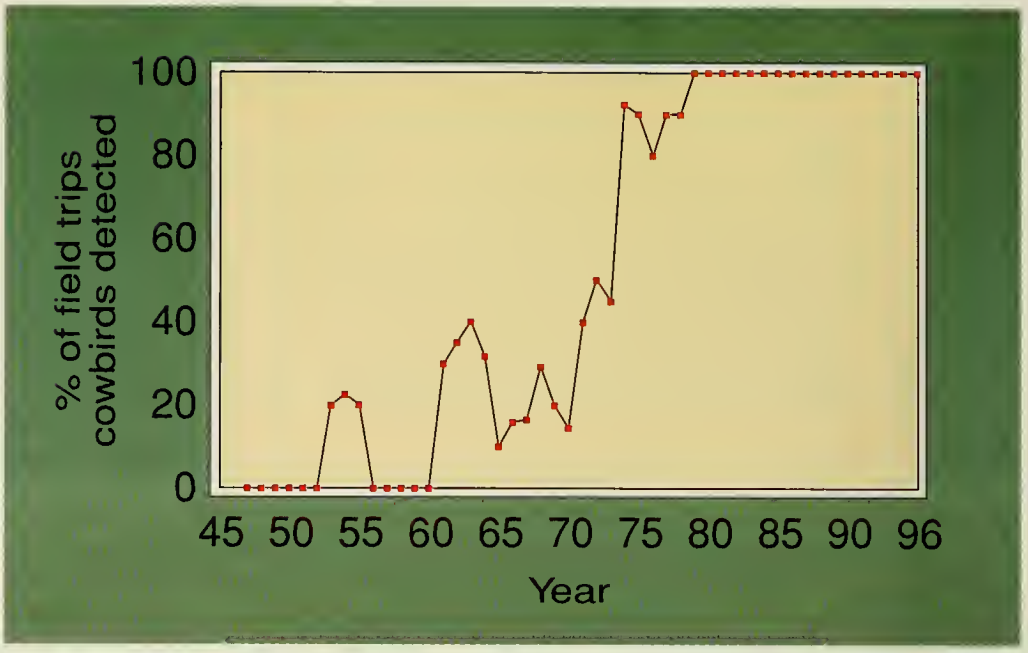
Biologists question how much impact the booming populations of cowbirds are having on host species. "A little parasitism probably isn't a problem," says Tewksbury. "It's a *lot* of parasitism that becomes a problem." The cowbird's expansion exposes "naive" bird populations and new species to brood parasitism, and where the cowbird is abundant it can pose a major threat to the productivity of host species.

Cowbird females can lay very nearly an egg a day and as many as 30 to 40 eggs in a breeding season, a feat that has earned it the nickname of "passerine chicken." If there's just one cowbird chick in a nest, some larger hosts such as wood thrushes and red-winged blackbirds may be able to raise their own young as well. The diminutive warblers, flycatchers, sparrows, and vireos, however, have a tough time providing enough food for a mixed brood. Some biologists think that the host's success depends on the richness of the surrounding habitat.

In the most severe cases, species hit hard by habitat loss face a double whammy from cowbird parasitism. For instance, the Kirtland's warbler in Michigan, the black-capped vireo in Texas and Oklahoma, California's least Bell's vireo, and the willow flycatcher of the Southwest are seriously threatened because they've lost much of their original habitat. Each species now also contends with cowbirds, requiring drastic and expensive cowbird control efforts.

In the patchwork woodlands of the Midwest, researcher Scott Robinson of the Illinois Natural History Survey

Forty years of field trips by University of Montana ornithology classes documented the increase in brown-headed cowbirds in the Missoula and Bitterroot valleys. The same sites have been visited since 1947, and since 1979 cowbirds have been detected on all field trips and all sites. Figure courtesy of Erick Greene, University of Montana.



found high parasitism rates in every forest patch he surveyed in southern Illinois. Coordinating his studies with researchers across the Midwest produced dramatic results. In extensive forests, Robinson found, cowbird parasitism is low and poses little threat to songbird communities. However, wherever agricultural pastures and fields dominate, interspersed by small patches and strips of woodland, forest songbirds can no longer find cowbird-free places to nest.

Researchers in Montana are just beginning to investigate the cowbird's impact. Dick Hutto, a professor of ornithology at the University of Montana, recalls that red-eyed vireos were common in the cottonwoods along the Bitterroot River 10 years ago, but he's hard-pressed to find a single individual today. A common cowbird host, red-eyed vireos sing from their nests, thus revealing the location with a trumpet call to cowbirds. Hutto wonders if parasitism has played a key role in the vireo's apparent local decline. Erick Greene began studies of lazuli bunting song patterns on Mount Sentinel in Missoula, only to find that most of the bunting nests were parasitized. But evidently parasitism is greatly influenced by how cowbirds use the local landscape. When a nearby cowbird roost on the Clark Fork River was flooded out in high water, parasitism on Greene's study site dropped to nearly nothing.

Bitterroot Perspectives

How are cowbirds using the Bitterroot landscape? How far do the females range between feeding and laying sites? Where do the cowbirds roost? With funding from the Montana Fish, Wildlife & Parks Nongame Program, Tewksbury and one of his assistants, Mike Johnson, are tackling these questions with radio-telemetry.

"I have nine radioed cowbirds with good data," says Johnson, "and I've picked them up on breeding, foraging, and roost sites. Most of the time I find them feeding right under the hooves of cows. They'll fly from cow to cow, and will go to horses also."

On a clear July morning, Dan Cariveau is tracking a female cowbird for Johnson and Tewksbury along a foothill stream. He holds the antenna over his head, picks up the signal, loses it, picks it up again, and then he's off and running upstream through the willows. The sun has just crested the ridge and the day is warming up, the mosquitoes whining. Cariveau chases the soft beep, crossing and recrossing the stream, branches tearing at his jacket. He is soon sweaty and bug-bitten, but finally pinpoints the signal at its strongest point low in a willow thicket. The cowbird is hidden somewhere within the tangle of green and makes not a peep. Time now to "hurry up and wait." Cariveau plops down with binoculars and data sheet to quietly observe. He will try to get a sighting of the bird so he can record information on her behavior and the surrounding vegetation, and then hopes to follow her until she moves off to feed for the afternoon.

Tewksbury has found that cowbirds become scarcer the farther the study sites are from agriculture and pastures, and they are most common close to the deciduous woodlands of cottonwoods and willows along the rivers and streams. The radioed birds commute up to a mile and a half from feeding sites to nests in the riparian woodlands, and they seem to stay within the same territory, visiting the same feeding, laying, and roost sites. After mapping all of the summer's radio locations, Johnson and Tewksbury will run an analysis with a computerized Geographical Information System to better understand how the cowbirds are using the landscape. With this information, they hope to learn if there are ways to minimize the local impact of cowbirds.

High-Tech Snoops

With a skill for patient observation, Alison Banks is teasing apart just how host behavior influences parasitism. Quietly spying on nests, Banks ob-

LEE KAISER

Like flashes of sunshine, yellow warblers can often be seen darting through streamside woodlands. While this nest has not been parasitized, the Bitterroot study shows a cowbird parasitism rate of nearly 70% for yellow warbler nests.

served that the dusky flycatcher, which has the lowest rate of parasitism in the study, is very secretive. "The female gives an incessant chip when she's on the move," Banks explains, and so the bird is hard to pinpoint, "and the male's song doesn't transmit very far." On the other hand, warbling vireos and yellow warblers are busy and vocal around their nests, and both species are parasitized frequently on the study sites.

Just how a host deals with cowbird parasitism depends on the species, and some hosts tolerate more parasitism in a population than others. On Tewksbury's study, American redstarts seem to have a low level of productivity even in normal conditions. When parasitized, they don't usually renest and are rarely able to raise their own young in addition to a cowbird chick. Even at parasitism rates as low as three out of every ten nests, redstart populations drop. In contrast, eight out of every ten warbling vireo nests on Tewksbury's lowland study sites were parasitized. But vireo nests in the foothills were able to escape cowbirds, so the overall population may be able to withstand some parasitism. Likewise, yellow warbler nests were parasitized nearly 70% of the time, but they seem better able to tolerate high parasitism since they will renest or are often able to raise a mixed brood.

With a bit of video wizardry, Tewksbury is snooping into the behavior of yellow warbler hosts toward cowbird chicks. The window first opened when a wildlife film crew from Japan visited Tewksbury's sites. Setting up a "lipstick" camera, a video lens no larger than a tube of lipstick that's backed by a van-load of electronics, the crew taped the comings and goings of a yellow warbler pair as they fed their mixed bag of nestlings. The warbler parents divvied up the food between the nestlings, but as he watched the monitor Tewksbury nearly went through the van roof as he saw the female consistently feed her own young over the cowbird. Was she showing a preference toward her own nestlings?

Though such behavior has never been recorded, Tewksbury is cautious to draw any conclusions. It's possible the cowbird was simply full, and not begging as much as the warbler nestlings. But such a preference would certainly be adaptive where parasitism rates are high. Excited by the question, Tewksbury armed himself with several camcorders and took hours of footage of other warbler nests. Perhaps he will find another clue to the push-pull dance of adaptation between cowbirds and their hosts.

It's apparent that the cowbird's impact on songbirds is not a simple question. "The more we dig into the problem, the more questions I have," says Tewksbury. The landscape, local abundance of cowbirds, host behaviors, and the distribution of hosts and cowbirds all contribute. "These links have never been brought together in one study, so this is what I'm trying to do. It's the only way we can ever really understand the effects of cowbird parasitism," Tewksbury says, turning over his thoughts as though fingering another piece of the puzzle. ■

The Bitterroot Riparian Bird Project is supported by many partners and cooperators, including: Bitterroot National Forest; Intermountain Forest and Range Experiment Station; Montana Cooperative Wildlife Research Unit; U.S. Fish and Wildlife Service; Montana Fish, Wildlife & Parks; Teller Wildlife Refuge; and eight private landowners in the Bitterroot Valley.

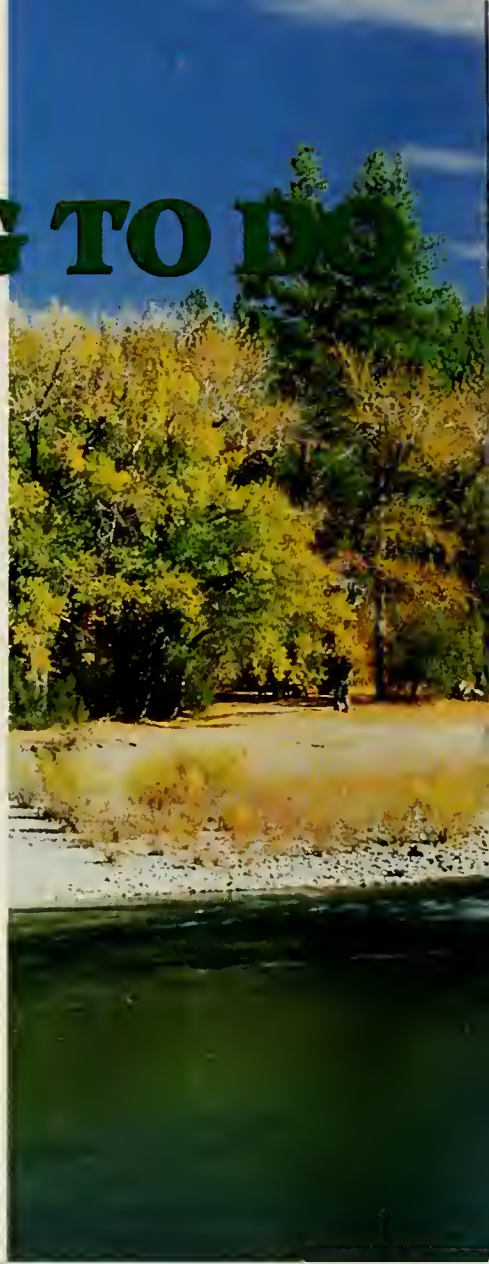
Bull Trout Restoration

THE RIGHT THING TO DO

by JOHN FRALEY

A FEW YEARS AGO, Governor Marc Racicot convened a roundtable to explore ways of restoring Montana's largest native trout—the bull trout—across western Montana. Since then, a team of policy makers and scientists has worked on a restoration goal and pulled together information about the fish. Now Montana's bull trout restoration efforts are moving forward in typical Montana fashion—at the local level.

Several "watershed groups," made up of ranchers, conservationists, business people, and other members of the community, are meeting and doing good things for bull trout in the Blackfoot, Rock Creek, and other drainages. These citizen groups will apply the guidelines and science compiled by the restoration team.



"Montana Bull Trout" by Ron Jenkins © 1996 (see p. 20 for details)

As part of a grassroots effort, several "watershed groups" made up of concerned citizens are working to restore bull trout numbers in the Blackfoot (above), Clark Fork, Rock Creek, and other drainages.

JOHN LAMBING

The watershed groups are part of the approach to restoring a species that was found to be "warranted but precluded" for listing under the Endangered Species Act in 1994 (see sidebar, p. 17). This populist angle, according to Governor Racicot, ensures full access for all Montanans to the decision-making process. "The solutions to bull trout restoration are as diverse as the threats to bull trout," says Governor Racicot. "I'm convinced—and I think our experiment shows—that people working in good faith and in honest purpose will put self interest aside and will develop consensus proposals."

Will the home-grown approach to species recovery work? A lot depends on the will of Montana citizens. As with most new efforts, progress has been slow. But things seem to be picking up.

"I think at first we had an idealistic view that these watershed groups would solve the problems on private lands," says FWP native fish coordinator Shelley Spalding. "But these folks lead busy lives and have many other things to do, and the problems are complex. This recovery process is not going to happen overnight."

Rancher Tom Sanders of the upper Rock Creek watershed committee believes the grassroots approach will work. "I think it's a good idea to solve our problems locally," he says. "I don't think having the government come in and tell us what to do will solve anything."

The upper Rock Creek watershed effort is beginning to show promise. The meetings have been positive, and on one outing, members identified about 40 bull trout spawning "redds" (nests) on the East Fork of Rock Creek above the East Fork Dam. The group has produced a poster to help anglers identify bull trout. Also, area ranchers are planning fencing projects to protect streamside areas. "We're just getting started, but I believe anything we can do will help," says Sanders. "It's going to be a long effort."

Ellen Knight, director of the Rock Creek Trust, chairs the lower Rock Creek watershed group. "I certainly hope this citizen effort will work," she says. "People have to see something concrete come of it to really get involved." She

JOHN FRALEY

Much of the South Fork of the Flathead drainage lies within the Bob Marshall Wilderness Area, where restoration efforts have focused on conserving the existing, stable, migratory population of bull trout.

believes that, in addition to landowners, anglers who love Rock Creek will be essential allies to the bull trout projects in the drainage.

Knight's land trust group has protected 3,000 acres of land along nine miles of Rock Creek during the last 10 years. "Our past efforts fit right into the bull trout program," she says.

Greg Tollefson, also with the land trust, sees public awareness of the "precarious state" of the bull trout as a key element in the effort to help the species. "The public in general, and anglers in particular, need to be reminded that it's their responsibility to do whatever they can to help this fish," he says.

In the Blackfoot drainage, the bull trout watershed group has been a focus of the citizen-based Blackfoot Challenge. The Blackfoot watershed group is looking at areas important to bull trout, identifying problems with bull trout habitat, and formulating potential solutions. The group has begun by considering six bull trout "core" areas: North Fork of the Blackfoot, Landers Fork of the Blackfoot, Monture Creek, Copper Creek, Belmont Creek, and Gold Creek.

Participant Amy Dumas says that meetings have been positive so far, and she likes the idea of decentralizing natural resource management to the local community. "I think people realize that this is an opportunity to protect a species which can serve as a flagship for the Blackfoot Valley," she says.

A deep tie to the land brought Ovando-area rancher Jon Krutar into the bull trout restoration process. Two spring creeks on his land have been important to his family for generations. "Eastern brook trout were considered a favorable species in my youth," he recalls. "I'd catch them, mom would fry them up, and my little sister would eat them, bones and all. We never thought of bull trout as an edible fish, or a fish of much interest." Now, Krutar is committed to doing what he can to restore bull trout.

Krutar watched bull trout decline in the area and worked with FWP on some of the first stream improvements in the Blackfoot. "Being involved in the stream work heightened my awareness of the whole issue," he says. "I became interested

in learning what we've done right and what we've done wrong over the years." The Blackfoot watershed group is making progress, says Krutar, as they develop the way they will rank risk factors to bull trout in each drainage. He says that it is important to get input from local people, particularly a historical perspective, which isn't available in the literature or from professionals. He also believes it is important to link bull trout recovery efforts with efforts aimed at restoring westslope cutthroat trout.

Dennis Workman, FWP fisheries manager for Region 2 in Missoula, likes the idea of the local watershed approach. He believes the effort has attracted the attention of landowners and government agencies. But, he says, the effort must now sharpen its focus. "The restoration effort seems to be at a point now where it needs to shift gears from meetings to action," says Workman. "We need to deal more with individual landowners in areas where stream habitat improvement opportunities exist."

Workman notes that many projects, like those ongoing on Jon Krutar's ranch, will improve streams and help bull trout, and that these efforts must be coordinated closely with the watershed group work. He points out that more effort could be devoted to restoring damaged streams and reconnecting stream channels that have been blocked or diverted.

For example, biologists are screening stream diversions in the North Fork of the Blackfoot so bull trout won't end up in irrigation diversions. In another project, woody cover lost during past logging was added to Gold Creek and more pools were created. "The fish moved in almost before the equipment left," Workman says.

Don Peters, an FWP fisheries biologist in Missoula, and Ron Pierce, an FWP research specialist, have been the architects of the stream projects in the Blackfoot (see sidebar, p. 20). Peters and Pierce spent two years looking at habitat in 19 tributaries to the Blackfoot River used by trout for spawning and nursery areas. They identified significant habitat problems in 17 of the tributaries and initiated restoration work immediately with the cooperation of landowners and the Big Blackfoot Chapter of Trout Unlimited. "These stream problems were obvious," says Peters. "They slapped you in the face." Peters notes that the problems added up to a lack of spawning and rearing areas in the tributary streams.

With the help of Trout Unlimited and the Future Fisheries Restoration Fund, Peters and Pierce began a systematic program to fix such things as broken-down stream banks, barriers to fish migration, water diversions, and streamside vegetation damage. They started with simple projects, ones they knew would succeed, reasoning that success begets success. "If you remove a barrier that blocks fish on a spawning stream, you know you'll have quick results," says Peters.

The program grew until now it involves more landowners, agencies, and stream habitat improvement projects than any effort of its kind in the nation. "I think the reason it has worked is because FWP has gone into the culture of the ranchers to work on these problems," Peters says. "We didn't ask them to come into our bureaucracy." Peters believes that working with these individual landowners at the grassroots level has been more successful than a series of meetings would have been.

Even with the successes, Peters believes that the effort—and all efforts aimed at restoring stream habitat, bull trout, and other species—will require a long-term commitment beyond what most people conceive. "We'll need to be there

Bull Trout Status Under the Endangered Species Act

LARRY JAVORSKY

In 1994, after extensive review, the U.S. Fish and Wildlife Service (USFWS) determined that listing the bull trout under the Endangered Species Act (ESA) was "warranted but precluded because of higher priorities." But last November, a federal judge in Oregon gave new life to bull trout listing when he ruled the USFWS must reconsider its 1994 decision. The judge noted that the USFWS based part of its decision on the fact that it and other agencies were taking steps to help bull trout. The promise of doing good things in the future, he said, cannot be grounds for decision-making under the ESA. As a result of the judge's ruling, the USFWS must soon reach one of three decisions:

(1) Listing is warranted. At the end of a one-year public comment period, when new information is reviewed, the final ruling could be one of three sub-options: (a) listing is warranted; (b) listing is warranted but precluded—i.e., bull trout should be listed but other species have higher priority (this would confirm the 1994 ruling and a 1995 review of the ruling); (c) listing is not warranted. (Note: An emergency listing can be made. Under this provision, listing is immediate and is in force for 270 days, during which time a permanent rule can be prepared).

(2) Listing is warranted but precluded.

(3) Listing is not warranted.

for a generation," he says. For example, many projects, like the 10 completed irrigation diversion screenings, require regular maintenance once they are in place. Land and water management projects must be monitored and adjusted to achieve desired ranching, forestry, and wildlife goals.

IN NORTHWESTERN MONTANA, bull trout restoration faces a somewhat different set of problems and opportunities. The entire South Fork of the Flathead watershed above Hungry Horse Dam is managed by the U. S. Forest Service; much of the drainage is within the Bob Marshall Wilderness. Because no private land is involved, restoration efforts have focused on an interagency conservation agreement between the Forest Service, FWP, the Bonneville Power Administration, Confederated Salish and Kootenai Tribes, Bureau of Reclamation, and the U.S. Fish and Wildlife Service. FWP fisheries biologist Scott Rumsey believes the agreement will protect and enhance the bull trout population in the reservoir and in the river upstream.

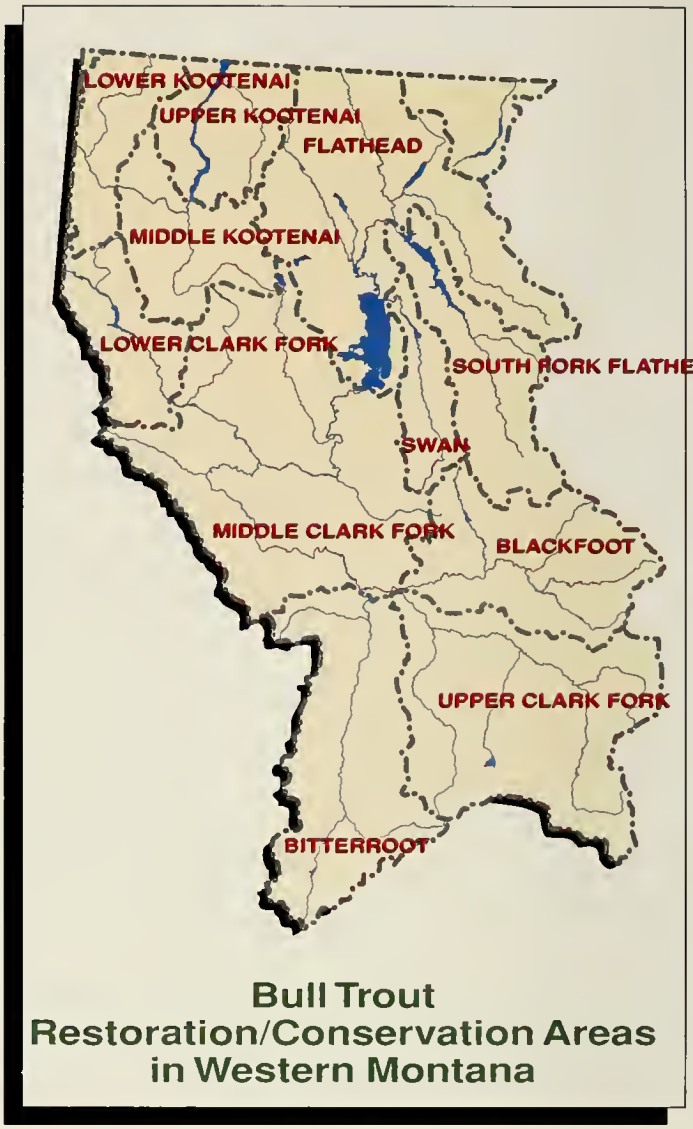
Chris Hunter, FWP special projects bureau chief in Helena, says that the South Fork effort may be the least complicated in the state. "It involves things already agreed to by the agencies and the public," he notes. "We've just repackaged a series of individual agreements so the pieces relate directly to bull trout recovery."

In the rest of the Flathead, though, things are far from simple. Bull trout residing in Flathead Lake and spawning in the North and Middle forks of the Flathead River have declined sharply in the past seven years. Bull trout redd counts in tributaries plummeted to a new low in 1996. Land ownership in the lake and river system is mixed, and the causes of bull trout decline are complex and vigorously debated.

"The Flathead extends from a foreign country [Canada] to a sovereign nation [Flathead Indian Reservation]," says FWP Region 1 fisheries manager Jim Vashro. Vashro notes that the four big problems for bull trout in the drainage are exotic species, dams, habitat damage, and poaching. The biggest problem is the non-native lake trout, which is thought to prey on bull trout and compete with them in other ways.

The watershed group in the Flathead, which will be chaired by a federally funded coordinator, will face a daunting challenge. "The big question," says Vashro, "is what do we do if the public says they like the lake trout fishery and don't want us to reduce lake trout to favor bull trout?" Vashro adds that it may be hard to reduce lake trout to the point of giving bull trout the edge. He notes that Canadian studies show that bull trout do not thrive in the presence of lake trout, particularly if *Mysis* shrimp are also present.

Wade Fredenberg, a fisheries biologist with the U.S. Fish and Wildlife Service and a member of the bull trout scientific team, believes the opportunity to do something to help bull trout in the Flathead is slipping away. "The Flathead Lake bull trout population is one of the keystone populations in the entire range of the species," he says. "The issues are biological and in my judgment can be solved but we need to act swiftly. The restoration process is designed to work over a period of decades, but it's painfully slow when a crisis situation like this arises."



Bull Trout Restoration/Conservation Areas in Western Montana

Another watershed coordinator will lead efforts to restore bull trout in the Kootenai drainage, where ownership is mixed between Montana, Idaho, and Canada. Vashro notes that Lake Koocanusa bull trout are a bright spot, but that their main spawning areas in Canada's Wigwam River are threatened by large-scale timber developments.

In the Swan drainage, bull trout populations seem to be booming, with record spawning nest counts in each of the last five years. But even in the Swan there are threats, such as non-native brook trout (which can hybridize and compete with bull trout), further introductions of non-native fish, forestry practices, and the recent discovery of whirling disease in the drainage. "The Swan is a bright spot, though," Vashro says. "It shows that with the right circumstances and good management, bull trout can be sustained and thrive into the future."

FWP native fish coordinator Shelley Spalding holds a

MONTANA BULL TROUT RESTORATION WATERSHEDS

WATERSHED	BULL TROUT POPULATION STATUS	MAJOR PROBLEMS	RESTORATION GOALS
Bitterroot River	Isolated resident/remnant population.	Introduced fish species; stream dewatering.	Establish migratory populations.
Lower Clark Fork River	Few migratory populations persist.	Dams; forest practices; mining; poaching.	Reestablish river migrants; connect with Lake Pend Oreille.
Middle Clark Fork River (including Flathead River to Kerr Dam)	Few migratory populations.	Dams; water quality problems.	Reestablish river migrants; connect with Rattlesnake Creek.
Upper Clark Fork River (including Rock Creek)	Isolated resident/remnant populations; migrants in Rock Creek.	Mining; habitat fragmentation.	Establish migratory population; specific plan for Rock Creek.
Blackfoot River	Much-reduced migratory population.	Mining; introduced fish species.	Increase population connections between river and tributaries.
Flathead Lake and River (including the North and Middle Forks)	Migratory population reduced by two-thirds or more.	Competition/predation by lake trout; poaching; habitat decline.	Protect genetics; reestablish strong migratory runs of the 1980s.
South Fork Flathead River	Stable migratory population in Hungry Horse Reservoir and river upstream.	Reservoir water level fluctuations; poaching; exotic fish introductions.	Conserve existing stable migratory population.
Swan Lake and River	Strong migratory population; record numbers in each of the last five years.	Exotic fish introductions; brook trout; habitat quality.	Conserve existing strong migratory population and genetics.
Lower Kootenai River	Much-reduced migratory populations.	Introduced fish species; poaching; habitat damage.	Improve habitat in spawning streams, protect genetics; improve coordination with Idaho and British Columbia.
Middle Kootenai River	Reduced migratory populations, isolated residents.	Forest practices; Libby Dam effects; poaching; introduced fish species.	Maintain migrants; increase habitat connections.
Upper Kootenai River	Relatively strong migratory population isolated by Libby Reservoir. Most spawning habitat is in British Columbia.	Exotic fish species; residential development; forest practices.	Maintain migrants; work for Libby Reservoir water levels helpful to the fishery; conserve British Columbia spawning areas.

realistic view of the difficulty faced by the watershed groups. "The best tool they will have is their own creativity," she says. "We can provide the technology and the public awareness efforts so that people can see the bull trout restoration effort is important and serious. Farther down the road, these groups can identify projects that need to be done. It takes a lot of time, which means we need to have a lot of persistence mixed with patience."

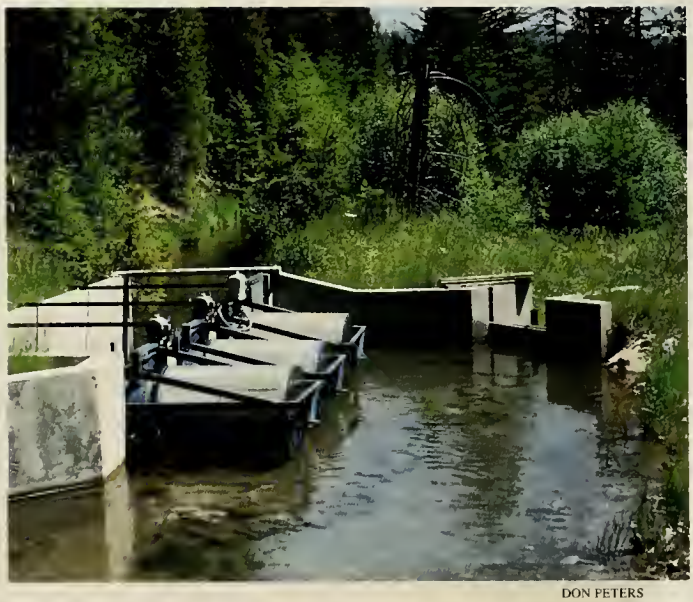
FWP fisheries manager Dennis Workman sees the need for an on-the-ground approach to begin immediately. "The struggle is how to roll these watershed group efforts into what we're already doing in areas such as the Blackfoot," he says. Workman remains optimistic that the efforts will be successful, especially in places where habitat is the limiting factor. When asked if he believes Montana can restore bull trout, he replies, "I know we can. We're doing it now."

Rancher Jon Krutar believes that through education, people can be motivated to help bull trout by focusing on a higher objective. "One thing I've picked up on is that this fish is a lot like a canary in a mine shaft—it's an indicator. Not many people have a love affair with bull trout, but bull trout are sensitive to things affecting the stream's well being. Everyone can identify with that."

Governor Racicot says he is committed to restoring bull trout because the fish is a native Montanan and we have an obligation to assure survival of our native wildlife; that we should restore bull trout not because we have to, but because it's the right thing to do. "The challenges are immense," he says, "but the potential rewards to our people and our fish and wildlife are enormous." ■

MONTANA BULL TROUT
LAKE MCDONALD • GLACIER NATIONAL PARK

A 16" X 26" fine art poster of this Ron Jenkins painting is available from Wild Rivers Publishing Co., 660 E. Mansion Heights, Missoula, MT 59803. Half the proceeds from sale of the poster ($50 signed, $35 unsigned) will go the the bull trout restoration effort.



DON PETERS

At the entrance to the Lund/Jorgenson ditch on the north Fork of the Blackfoot River, screened drums prevent bull trout from entering the irrigation system.

New Irrigation Structures Save Bull Trout

by DON PETERS, Fisheries Biologist
RON PIERCE, Fisheries Technician

The North Fork of the Blackfoot River serves as a critical spawning, migration, and rearing stream for Blackfoot River bull trout. During their life cycle, these bull trout move as much as 52 miles from spawning/rearing areas in the North Fork to wintering areas in the lower Blackfoot.

Ranchers along the North Fork, familiar with our willingness to work at solving problems, informed us of a possible problem with bull trout entering their irrigation systems. During their downstream spring migration, some bull trout were being funneled by diversions into irrigation canals. When the canals were closed in fall, bull trout remaining in them perished.

Subsequent investigations in and around the Lund/Jorgenson ditch confirmed significant losses of young and adult bull trout in the ditch system. Census work showed significantly fewer bull trout in the North Fork below the ditch system than above. Through a cooperative effort, "fish-friendly" irrigation structures designed to keep fish from entering the canals were installed on all five of the North Fork's major diversions.

First Place—Joe Thornbrugh

Thornbrugh Wins 1997 Waterfowl Stamp Contest

by William Phippen

Victor artist Joe Thornbrugh has won Montana's state waterfowl stamp contest for the fourth time. Based on the decision of a panel of judges in Helena on November 13, his painting of a golden retriever with a drake mallard in its mouth will be reproduced as Montana's 1997 waterfowl stamp.

Thornbrugh also won the stamp's inaugural competition in 1986, as well as the 1990 and 1991 competitions.

Jim Borgreen of Lewistown and Wayne Dowdy of Polson placed second and third, respectively.

Second Place—Jim Borgreen

Third Place—Wayne Dowdy

Thornbrugh is a full-time artist whose paintings reflect the painstaking research he undertakes on his subjects before he ever places a brush on canvas; he spends approximately half his time studying and sketching and the other half translating that information into his works. His paintings also reflect his life-long interest in wildlife, particularly waterfowl and other birds, his favorite artistic subjects.

Thornbrugh's works have been shown at the Los Angeles County Museum of Natural History; the National Wildlife Federation headquarters in Vienna, Virginia; the Museum of Native American Cultures in Spokane; the Leigh Yawkey Woodson Art Museum in Wausau, Wisconsin; and the Charles and Emma Frye Museum in Seattle. His painting of a ring-necked pheasant has been exhibited in the National Collection of Fine Arts at the Smithsonian Institution in Washington, D.C. In addition, his paintings illustrate the popular guides to identification of owls and birds of prey that originally appeared in *Montana Outdoors*.

"This year's stamp was of special interest to me," notes Thornbrugh, "since a dog is part of the design. Those of us who own dogs and hunt with them enjoy their company and know how important they are not only for retrieving downed game, but also to the entire waterfowling experience."

Of winning the 1997 competition, Thornbrugh says, "It's always exciting to win [a waterfowl stamp contest], and winning the Montana competition again certainly is an honor. Over the past decade, since the contest's inception, I've had the opportunity to see the results of the waterfowl stamps in use, and it's gratifying to me that not only waterfowl, but many species of nongame wildlife, are benefiting from the funds the stamps generate."

The 1985 legislature gave Montana Fish, Wildlife & Parks the authority to produce and sell the state waterfowl stamp. Waterfowl hunters are required to purchase the $5 stamp, and proceeds from sales of the stamps and related artwork are used to fund waterfowl habitat improvement projects. Since the first stamp was sold in 1986, more than $1.5 million has been generated for wetland enhancement in Montana. Additional revenue is derived from sale of limited edition prints that range in price from $141 for a signed print and stamp to $556 for an "executive edition" numbered, signed, and remarqued print with a stamp and gold-plated medallion embossed with the winning painting. Prints of the 1997 waterfowl stamp can be ordered through select art galleries in Montana. ■

Linking Prehistory to Posterity

Sieben/O'Connell Ranch Easements

by GAYLE JOSLIN

SINCE THE ICE AGE of the late Pleistocene, wildlife and the people who hunted them have moved north and south along a corridor of wildness. The corridor extended from the ancient Arctic plains of Beringia, a land bridge that once linked Alaska to Siberia, to the core of the continent. This corridor was known to stone age hunters. It was home to massive wildlife herds of a pristine continent for tens of thousands of years. It was the way things were when the earth was young.

GAYLE JOSLIN

Thanks to the conservation ethic of the O'Connell and Baucus families, three new conservation easements have been formalized in a 33-square-mile area north of Helena. Black bears, mule deer, and blue grouse are just three of many species avialable for hunting and wildlife viewing on these areas.

PHIL FARNES

MILO BURCHAM

W. STEVE SHERMAN

In more recent times this corridor, which in Montana stretches from the east slopes of Glacier National Park to the Gates of the Mountains north of Helena (see map), has been the site of a significant wildlife conservation and restoration effort. A century ago, the commerce in wildlife had depleted many native animal populations. From the ashes of that dismal period, a wildlife restoration effort led by hunters began the long process of replenishing the land. Because of that effort, wildlife is once again abundant along the ancient corridor.

The natural abundance we now enjoy is sustained by critical wildlife habitats assembled through the last half century. These habitats—wildlife management areas and an expanse of wilderness to the west—form the backbone of the recovery. The wilderness lands are the Bob Marshall, Scapegoat, and Great Bear. The wildlife management areas (WMAs) include the Blackleaf, Ear Mountain, Sun River, and Beartooth. In addition, private conservation organizations have contributed by acquiring the Boone and Crockett Club's Theodore Roosevelt Memorial Ranch north of Blackleaf and The Nature Conservancy's Pine Butte Preserve adjacent to Ear Mountain.

Just as important as these public conservation efforts has been the conservation ethic of private landowners. Through most of this century, many of them have been exemplary custodians of the public wildlife resource. Today, a new threshold has been crossed as landowners are declaring and securing their long-held land ethic through conservation easements. Three of these contributions, forever linking prehistory with posterity, have recently been formalized in a 33-square-mile area north of Helena: O'Connell Ranch Lyons Creek, Sieben Ranch Lyons Creek, and Sieben Rattlesnake Creek. In addition, FWP has acquired a 2,210-acre parcel of the Sieben Ranch in Mill Creek adjoining the Rattlesnake Easement. The four parcels total 21,271 acres.

In these families the ethic of conservation and community passes through the generations. In 1944, Brian and Helen O'Connell granted what was likely one of the first conservation easements in Montana. Fifty-two years later, their children, Patricia O'Connell Anderson and Richard O'Connell, consummated an easement with FWP to protect from development one of the remaining portions of the O'Connell estate, a 4,154-acre tract in upper Lyons Creek. Interspersed with the O'Connell property and extending farther down the drainage is 4,040 acres of the Sieben Ranch, placed under easement by John and Nina Baucus.

Lyons Creek, 20 miles north of Helena, is a strategic link in the wildlife corridor that extends from Canada to Yellowstone National Park. It is a turning point where wildlife may continue south along the Continental Divide or break away to the east. Lyons Creek flows into Wolf Creek Canyon, a narrow corridor affording wild creatures a reasonable opportunity to cross

Interstate 15. Once across the highway, wildlife are able to vanish into the shelter of the Sleeping Giant, a proposed BLM wilderness area.

At the head of the Giant, wildlife face another obstacle to eastward movement: the Missouri River. This site, too, is auspicious, because the grassy peninsula of Ming Bar, which gently slopes into the river from the east, allows wildlife passage to the Beartooth WMA and then south through the Gates of the Mountain Wilderness. Elk, mule deer, bighorn sheep, mountain goats, black bears, mountain lions, and even pronghorn antelope are all known to use this crossing. Beyond the "Gates," the Big Belt Mountains range southerly toward the Bridger, Gallatin, and Absaroka ranges of the greater Yellowstone region.

This conservation chronicle, however, is about much more than wildlife movements and land connections—it is about everyday subsistence on a rich and well-maintained land. The deep, rugged canyons of Lyons Creek provide habitat for a mother grizzly and her two cubs, as well as hunting grounds for lynx, wolverine, bobcat, mountain lion, coyotes, and a host of raptors. The creek itself offers spawning habitat for brown, rainbow, and brook trout. Timbered slopes provide security during fall for elk, mule deer, and black bears.

Adjoining the headwaters of Lyons Creek along the summit of Lyons Mountain and Mitchell Mountain, the 10,867-acre Sieben Ranch Rattlesnake Conservation Easement extends southward. Different in character from Lyons Creek, the Rattlesnake country grades from montane forest to sage-grassland foothills along Rattlesnake Creek. Grassy, south-facing slopes with high, windswept ridges provide excellent winter range for deer and elk. This area's diverse habitats shelter Hungarian partridge, blue and ruffed grouse, mule deer, elk, black bear, mountain lions, coyotes, bobcats, small mammals, numerous songbirds and raptors, and a few white-tailed deer.

Extending west from the center of the Rattlesnake Easement, the nearly 3.5-square-mile Mill Creek Fee Title parcel provides important habitat for elk, particularly in winter. This area's grass and sage parks interspersed with steep, timbered ridges also support mule deer, black bears, mountain lions, coyotes, and an occasional wolf or grizzly bear.

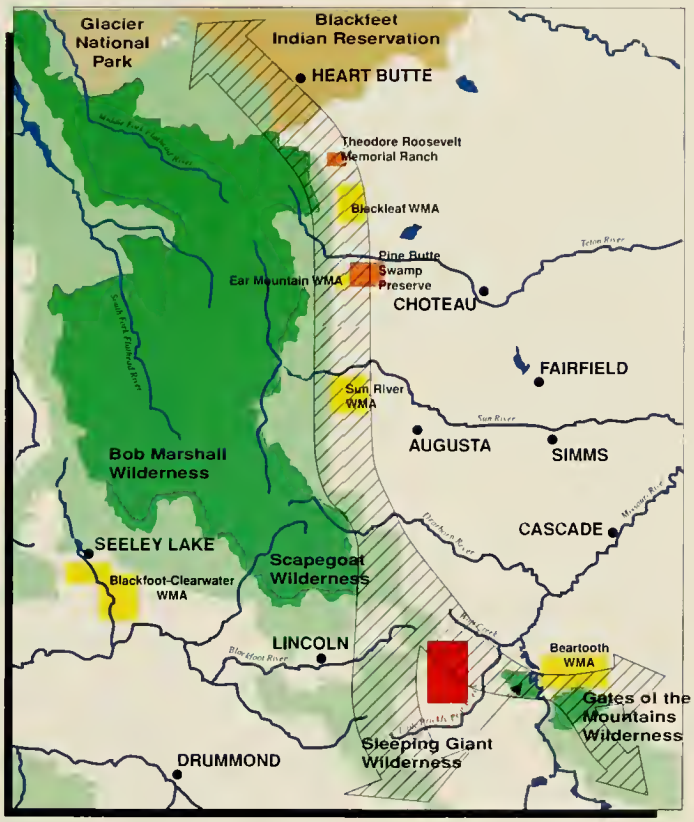
Careful land managers, John and Nina Baucus, owners of the Sieben Ranch, have continued their family's long tradition of allowing hunting access to their ranch. The easements in Lyons Creek and Rattlesnake Creek guarantee public hunting access in perpetuity, thereby extending the Baucus family's unique sense of stewardship and community to our children and beyond.

Provisions common to all three easements allow the landowners to: graze livestock; harvest timber in accordance with "best management practices" and notification of FWP; and, within the framework of the Rocky Mountain Front Wildlife Guidelines, explore for, develop, and extract oil, gas, and other hydrocarbons. Specific features of the Rattlesnake Easement allow the landowner to utilize gravel from a 40-acre area, install a communications tower in a mutually agreed upon location, and construct a single-family dwelling in a designated area. Allowed within each of the Lyons Creek easements is construction of two homes with restrictions on size and siting.

The following activities are prohibited on all three easements: control or manipulation of sagebrush; residential subdivision; surface disturbance as a result of hard rock, coal, or bentonite mining; aerial application of agrichemicals; feedlots; game farms; commercial or industrial use outside of traditional uses of the land.

All rights and restrictions of the easements will be carefully monitored to protect wildlife habitat. Perhaps most important, however, is the reality that now and forever wild animals will be able to move along the backbone of Montana and across the Missouri River, as they have for centuries.

Thanks to a modern conservation ethic, land links have been forged within the ancient chain of wildlife habitat that has stretched across North America since the time of the stone age hunters. This land ethic has been carried forward through the conviction of conservation-minded hunters, the foresight of legislative pioneers, and the generosity of Montana landowners. We are indebted to all of them.



Wildlife Movement Corridor Through Montana

- Sieben/O'Connell Easements
- Wildlife Management Areas
- National Park
- Indian Reservation
- Wilderness
- Forest Service
- Private Conservation Parcels
- Corridor

The Rattlesnake and Lyons Creek Conservation Easements

and Mill Creek Fee Title Acquisition

Location: Lyons Creek, Rattlesnake Creek, Mill Creek—In Lewis and Clark County 25 miles north of Helena, between the Continental Divide and Interstate 15.

Size: O'Connell Ranch Lyons Creek Easement—4,154 acres; Sieben Ranch Lyons Creek Easement—4,040 acres; Sieben Ranch Rattlesnake Easement—10,867 acres; Mill Creek Fee Title—2,210 acres.

Acquisition date: 1996.

Access: Access to Lyons Creek is from the recreation road along Interstate 15 (see map). Access to Rattlesnake Creek and Mill Creek is along State Highway 279 (see map).

Management goal: To conserve and protect in perpetuity wildlife habitat while providing public hunting access.

Hunting opportunities: Lyons Creek—Archery and rifle seasons for elk, mule deer, white-tailed deer, and black bear are open to licensed hunters, with permission required from the O'Connell Ranch. No permission is required for fall hunting on the Sieben Ranch, although spring black bear hunting requires landowner permission. Hunting opportunities also exist for blue and ruffed grouse.

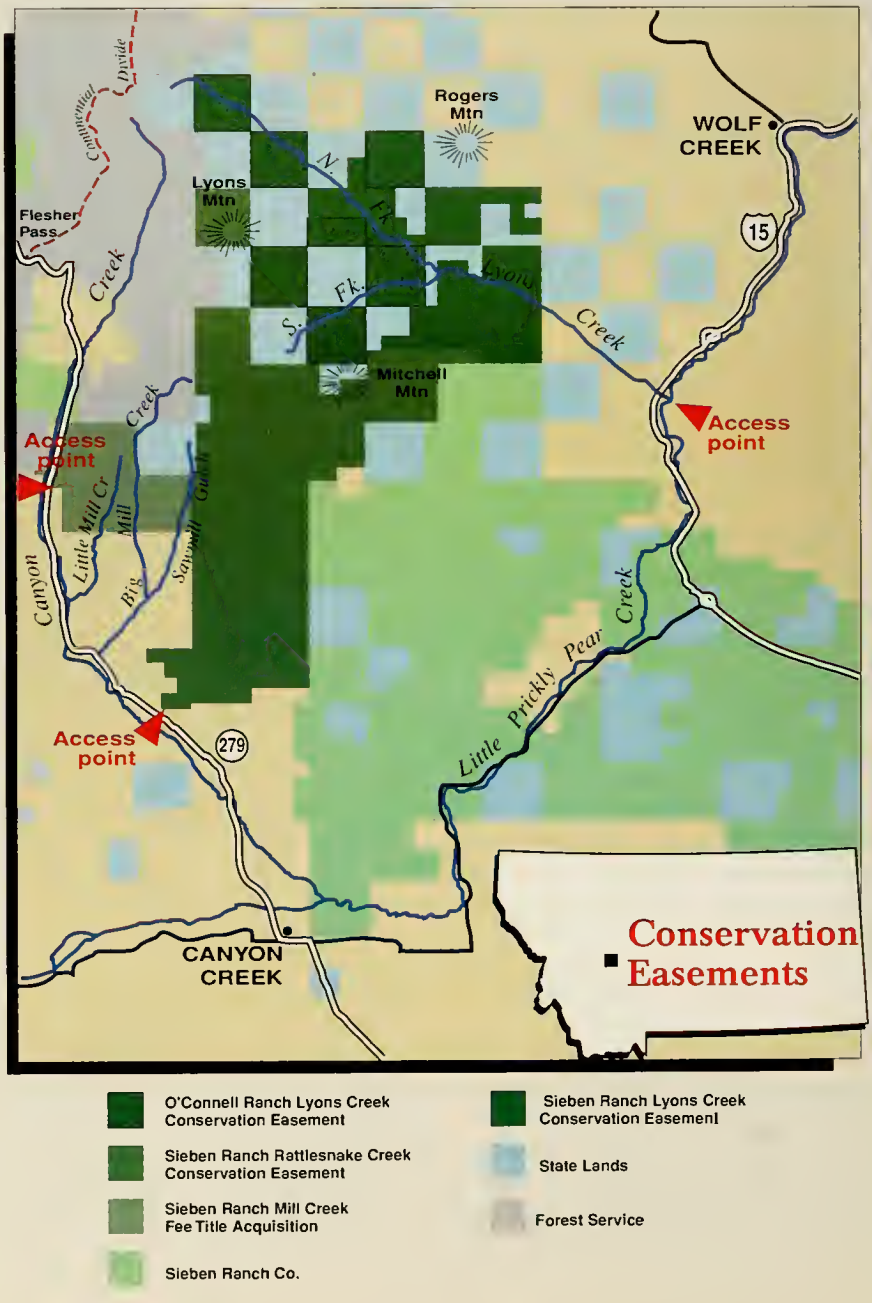
Rattlesnake Creek—Archery and rifle seasons for elk, mule deer, white-tailed deer, black bear, mountain grouse, and Hungarian partridge are open to licensed hunters (permission is not required for fall hunting).

Mill Creek—Permission is not required for fall hunting of elk, mule deer, white-tailed deer, black bear, and mountain grouse. Spring black bear hunting is allowed within posted restrictions.

Wildlife viewing: Lyons Creek—Elk, mule deer, white-tailed deer, and black bear are year-long residents (deer and elk may be scarce in severe winters). A host of birds and small mammals are year-long or seasonal residents. Other species include lynx, wolverines, bobcats, mountain lions, coyotes, wolves, beavers, and muskrats. A family of grizzly bears is also known to frequent the drainage. Lyons Creek is an important spawning stream for brown, rainbow, and brook trout. Wildlife viewing requires landowner permission.

Rattlesnake Creek—Elk and mule deer are the most common year-long residents; white-tailed deer and black bear are less abundant but regularly present. Hungarian partridge, blue grouse, and ruffed grouse are present, along with mountain lions, coyotes, bobcats, small mammals, and migratory and resident bird species. A nationally recognized raptor migration corridor sweeps across all of the properties. Wildlife viewing requires permission from ranch headquarters.

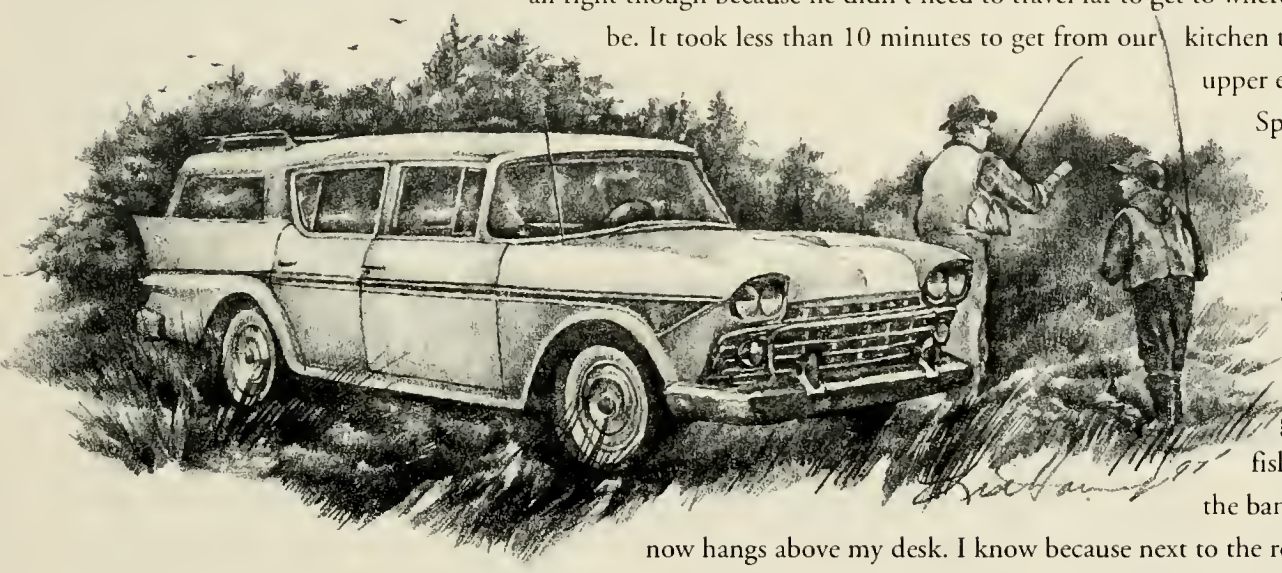
Mill Creek—Elk, mule deer, black bears, mountain lions, bobcats, mountain grouse, small mammals, and numerous migratory and resident bird species are present, as well as occasional wolverines, wolves, lynx, and grizzly bears. Wildlife viewing does not require permission, although seasonal use restrictions will be posted.



"Soul Music"

story by Mike Gurnett, illustrations by Lisa Harvey

Our home at 720 West Evelyn, in Lewistown, Montana, didn't change much between 1910 and 1972. My grandmother, my dad, my sister, and I all spent part of our childhood eating at the same table, running down the same stairs, turning the same door knobs. Dad worked in the business his grandfather started in 1903—one that didn't allow him much chance to get away for long. That seemed all right though because he didn't need to travel far to get to where he wanted to be. It took less than 10 minutes to get from our kitchen table to the upper end of Big Spring Creek. There's a big S-curve in the creek about two miles from the spring. My grandfather fished there with the bamboo rod that now hangs above my desk. I know because next to the rod is the watercolor my great grandmother painted as she watched her son work his way up Big Spring Creek toward the first bend. I could go there today and stand where she put her easel. My dad fished there. I know because I fished there with him.



Throughout the 1950s and '60s we always had two cars. No matter what year, make, and model, one was the family car and one was the fishing car. My favorite fishing car was a blue American Motors Rambler wagon. I remember it as kind of a stirred-up tackle box on wheels—no carpet—no radio—three-speed on the column. We had the 1958 version of a sport utility vehicle. It was ready to go and it went often.

Perspectives

When my kids grow up and move on the best I can hope for is that on the really good days and the really bad days they will think of the banks of the upper Missouri and they will want to be there.

There never was much warning that we would be heading up. Sometime during dessert the decision would be made. We went fishing when Dad had a good day and we went fishing when he had a bad day. Some days he wanted to go—some days he needed to go.

In those days I used his old rod, the one with the tip custom cut by the tailgate of the fishing car. We tied on a Hopper, Muddler, or an Adams, usually an Adams. Dad would hand me a couple of extra flies and send me upstream to the prime water. He would head downstream and fish up to where I started, never fishing behind me to fish that I couldn't hook. He gave me the best shot and was always downstream in case I fell in. If the fish wanted what we had—we caught fish. If they didn't—we didn't. Catching fish didn't matter much. There would always be tomorrow.

When Dad watched the fly drift through the riffles, everything else seemed to be blocked away. All his senses were in harmony with flyfishing. He loved the simplicity, the serenity, the rhythmic motion of casting. Dad was so at ease there. He had the creek for a bearing of place and he had himself fishing to measure time. It must have been something, watching me in the riffle his father had put him in. Fishing was what he and his boy did together.

Dad was always more content after a couple of hours on the water. However, he wasn't much for discussing the spiritual glide of time. Driving back we talked about the ones we caught, the ones we missed, and the Milwaukee Braves. We went into the house, cleaned the fish, and went to bed. That was that.

In 1972, with about as much planning as we put into our fishing, I headed off to college. With their youngest out of the nest, the folks decided they wanted to try something new, somewhere different, someplace warmer. My sister and I graduated from Montana State University, found jobs, met spouses, and set about to make our own lives. Eventually, the lure of grandchildren brought the folks back to Montana. Dad bought another fishing car and soon found what he needed at the end of a short drive to the Stillwater River. I was busy thinking about fishing, talking about fishing, reading about fishing, buying fishing gear, guiding people fishing, making two films about fishing, and fishing. As time went on, we fished together far less often and never again on Spring Creek.

When Mom and Dad came to Helena and the weather was half nice, we headed for the Missouri River. Why a person fished never changed for him. He seemed a little frustrated with the way I had managed to turn the simplistic beauty of flyfishing into such a fuss. We need the raft—no, the drift boat—sinking lines, no floating lines—this fly and that. Somewhere along the way I had managed to subdue the tranquil harmony he had worked so hard to instill in me. There wasn't any music conducted on those later trips. No one was any calmer by the end of the day. God forbid if someone landed a fish. The world stopped and I shot

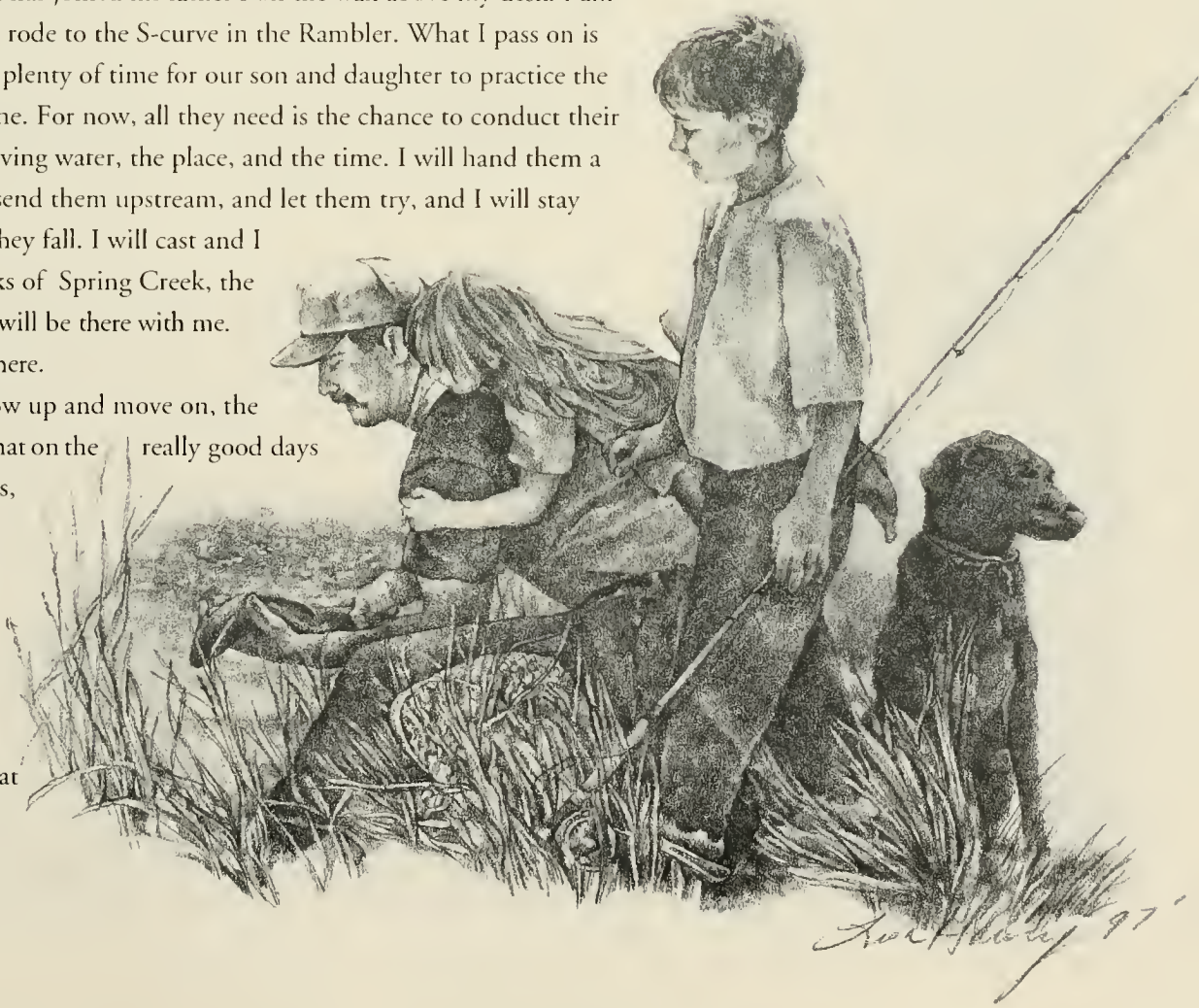
photograph after photograph. I had to have proof of the day. My guess is I've killed more fish with a camera than we ever cleaned in the sink on Evelyn Street.

The winter of 1995-96 marked some of the toughest days on record. Who cares what the chill factor is when the thermometer reads minus 42 degrees Fahrenheit. It was the kind of weather Dad just hated. We spent a cold Sunday evening together. General visitation was over and Mom decided to head home to get a few things done. Nothing was left to be resolved. We visited about family, friends, dogs, horses, and music. Of all the things in his lifetime and of my lifetime with him, that cold night we mostly talked about fishing. I headed back to Helena on Monday. Wednesday night I got a call and Thursday afternoon he was gone.

After the graveside service, a friend mentioned we should go fishing. Two weeks later, when there was a break in the weather, Steve and I headed to the Missouri. We each strung a rod, stepped into his boat, and headed down. We talked about serious stuff and stupid stuff, never changing a fly. We talked about our kids and our wives and we landed a couple of fish. We talked about what we would do if we were rich and decided not much would change. Most of the time the fish weren't interested in what we had to offer, but that didn't seem to matter. Sometimes we didn't talk at all. Sometimes we talked about our dads. And sometime during the day, I felt a rhythmic motion to my casting that didn't belong to me.

Now, Dad's flyrod has joined his father's on the wall above my desk. I am the only one left who rode to the S-curve in the Rambler. What I pass on is what will be. There's plenty of time for our son and daughter to practice the drills of mending a line. For now, all they need is the chance to conduct their own music in the moving water, the place, and the time. I will hand them a couple of extra flies, send them upstream, and let them try, and I will stay downstream in case they fall. I will cast and I will think of the banks of Spring Creek, the fishing car, and Dad will be there with me. And I will want him there.

When my kids grow up and move on, the best I can hope for is that on the really good days and the really bad days, they will think of the banks of the upper Missouri and they will want to be there. And they will want me there with them. Because fishing is what we did together. ■



NEW FWP FISHING PROGRAM BENEFITS FAMILIES

With Montana's wealth of world-renowned trout streams and a myriad of clear, clean lakes, it's hard to imagine there might be residents who never have an opportunity to get out and "wet a line" once in awhile. But unfortunately, even though we have one of the highest rates of angler participation in the nation, there are still some folks who find barriers standing in the way of spending time fishing with their families.

With this in mind, last August Montana Fish, Wildlife & Parks (FWP) Director Patrick Graham announced creation of a new statewide angler education program titled "Family Fishing Adventures" as part of Governor Racicot's Council on Families, which was conceived with the goal of identifying ways to strengthen Montana's families.

Montana's new angler education program is designed to reduce barriers to new or inexperienced anglers by:

• Enlisting a group of trained volunteer angler education instructors to conduct fishing clinics and other education events.

• Establishing a free fishing equipment lending program across the state, through which youths and their families can borrow basic tackle for a fishing trip.

• Establishing an angler education program for Montana schools based on

DAVE HAGENGRUBER

FWP's fishing clinics feature fly tying, basics of casting, fishing knots, water safety, and fisheries ecology, as well as a chance for kids to test their new skills.

MIKE GURNETT

FISHING INSTRUCTORS NEEDED

FWP's new Angler Education Program is looking for volunteer fishing instructors. This program, modeled after the highly successful Hunter Education Program, will use volunteer instructors to reach children and adults with a message of safe, ethical, and successful angling.

We'll supply the training, equipment, and assistance; all you need is a willingness to share your knowledge, experience, and love of fishing with beginning anglers. Instructor training classes are being scheduled around the state now for the upcoming fishing season.

If you belong to an organized club, this is a great opportunity for your members to work together to give something back to the resource and provide a valuable community service. To find out more about becoming a fishing instructor, or to schedule a training workshop in your town or for your club, call FWP's angler education specialist Dave Hagengruber at (406) 444-9736.

The future of quality fishing in Montana depends on cooperation from all of us in correctly training the anglers of tomorrow. Do your part to ensure that they grow up as knowledgeable, ethical outdoor enthusiasts who will protect Montana's fish and water resources. Become a fishing instructor.

the highly successful national program called "Hooked On Fishing, Not on Drugs."

• Introducing a bill in the 1997 legislature that would create a fishing license exemption for participants at approved FWP angler education events.

• Developing easily accessible fishing areas where kids and their families can try out their new skills.

Just a few weeks before Graham unveiled the new plan, an example of these components in action was taking place at Lake Josephine near Billings in the form of a fishing clinic for local kids and their parents. With the help of volunteer fishing instructors from local Walleyes Unlimited, Trout Unlimited, and rod and gun clubs, the kids attending this event learned the basics of casting, fishing knots, fly tying, water safety, and fisheries management and ecology. They even had a little time left over to try out their new skills at the end of the day.

"It's great to see these diverse sporting groups unite toward the common goal of introducing new anglers to the sport of fishing," said Bill Pryor, FWP's information officer in Billings who helped coordinate the event. "This is a winning situation all the way around. The instructors get to share their knowledge and love of fishing with others, the kids and their families learn a new lifelong recreational activity together, and the state's fisheries benefit because ultimately, these new anglers will be knowledgeable, responsible stewards of the resource."

With this new combination of dedicated anglers, kids, families, and fishing, it does indeed seem as if everybody involved is a winner.—*Dave Hagengruber, Conservation Education Division*

Film Festival Brings the World's Wildlife to Missoula

Action...adventure...comedy! And that's just the parade!

The "WildWalk" parade will kick off the 20th International Wildlife Film Festival on Saturday, April 5, in Missoula. Children of all ages and adults dress as their favorite wildlife or in theme-related costumes each year to march in support of the world's untamed critters. This year's parade theme is "Montana's Fish and Wildlife Diversity." As the parade winds down Higgins and ends at Caras Park, Children's Day begins in the park with free exhibits, hands-on activities, live critters, storytelling, singing, dancing, and more.

COURTESY OF INTERNATIONAL WILDLIFE FILM FESTIVAL

A "WildWalk" parade in which children of all ages dress as their favorite wildlife will kick off the 20th International Wildlife Film Festival on April 5 in Missoula.

The fun on Saturday sets the stage for a lively week. The film festival schedule includes a four-day wildlife filmmaking course, professional panel discussions, field trips, photography and art displays and, of course, showings of the best of the wildlife films entered in this year's competition.

The serious art of wildlife filmmaking is the reason the festival was created in 1977 by Charles Jonkel, a world-renowned bear biologist and former professor at the University of Montana. "Excellent wildlife productions are the best way to help people understand wildlife," says Jonkel. He began the festival because he was disturbed by the poor quality and the deception often involved in wildlife films of the 1970s.

The International Wildlife Film Festival (IWFF) is the longest-running juried film competition in the world. Its purpose is to foster production of wildlife films that are technically well done and scientifically accurate. The IWFF has launched the careers of dozens of filmmakers as the festival itself gained prominence. At this competition, the ethics involved in the production of wildlife films have always been as important as the content of the films.

Hundreds of films from producers around the world are judged each year. This year, the competition is so intense that judging panels will view and critique entries for 10 hours every day for 24 days. Judging panels are made up of six professionals, two each representing media and production, science and biology, and teaching or the humanities. This behind-the-scenes work takes place before the festival begins.

The benefit for more than 10,000 Montanans and visitors is that during the festival they have the chance to preview the dozen or so films judged to be the best. As a matter of fact, Missoula is the only place in the world where wildlife lovers can see the selected films as a complete series.

While visitors enjoy the fruits of their work, professional filmmakers from all corners of the globe will be participating in a series of workshops

dealing with issues facing their industry. One of this year's topics will be the importance of children as an audience for wildlife films. Ongoing debates over ethical issues such as film manipulation and staging scenes with wildlife are sure to continue as well, according to Jonkel.

Action...adventure...comedy. The best wildlife films educate in an entertaining way. And that education is important for our understanding of wildlife needs, behavior, and habitat.

The International Wildlife Film Festival runs from April 5 to April 12. A complete schedule of film screenings and all related events is available from the IWFF. Write IWFF; 802 East Front Street; Missoula, MT 59802, or phone (406) 728-9380.—*Carla J. Hall*

Working for the Wild Turkey

The National Wild Turkey Federation (NWTF), based in Edgefield, South Carolina, is a nonprofit organization dedicated to conservation of the wild turkey and preservation of the turkey hunting tradition. Founded in 1973, the NWTF coordinates the efforts of grassroots volunteers, state and federal agencies, and corporations to better manage the wild turkey and its habitat. Since 1977, the federation has assisted with over 5,400 state and national projects with expenditures exceeding $62 million.

The Montana State Chapter of the NWTF is supported by 220 members who comprise three local chapters: the Big Sky Local in Bozeman, the Missoula Chapter, and the Yellowstone Local Chapter in Laurel. Of the 220 members, 47 are JAKES (Juniors Acquiring Knowledge, Ethics, and Sportsmanship), which is the NWTF program for members 17 and younger. As an outreach and educational tool, JAKES events pass on the traditions of safe, ethical hunting and teach the principles of habitat management for all wildlife.

Since 1992, members of the Montana State Chapter have donated time and effort to help FWP biologists complete 18 wild turkey projects and have contributed nearly $11,000.

DONALD M. JONES

The three Montana chapters of the National Wild Turkey Federation have donated money and helped FWP biologists with wild turkey projects around the state.

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A NEW FISH FOR TIBER

by Bruce Auchly
Region 4 Information Officer
Conservation Education Division

PAUL UPDIKE

Biologists and anglers hope the introduction of cisco to Tiber Reservoir will produce bigger walleyes (above).

Steve Leathe, as a regional fisheries manager and weekend amateur hockey player, can appreciate the parallel between his job and his hobby. The late Jacques Plante, Hall of Fame hockey player, was once asked what it was like to play goalie. To paraphrase Plante: Imagine sitting in your office, minding your own business. Then, one day you make one mistake; one little mistake. Suddenly a red light goes on above your head. A siren sounds, and thousands of people start screaming obscenities and throwing garbage at you.

For the last 10 years, Montana walleye anglers have tried to convince Leathe that he was mistaken for resisting the introduction of cisco (sometimes called lake herring) into Tiber Reservoir. Leathe's job as FWP fisheries manager for Region 4, north-central Montana, gives him the burden of such decisions.

Last year, Leathe and local fisheries biologist Bill Hill, whose district includes Tiber, agreed the time had come to plant cisco there. The decision came using the time-honored methods of fisheries science. The biologists waited for solid data to justify introducing an exotic fish. "I certainly wasn't going to endorse something that had the potential for disaster," Leathe says.

The puck stops here.

The idea behind cisco, a member of the trout family that typically grows to 10 or 12 inches, is to produce bigger walleyes by giving them a dependable food base. Leathe and Hill, despite pressure strong and gentle, held back for years because of the potential risks.

"The last eight or nine years," says Rollie Armacost of Great Falls, "we here at Walleyes Unlimited (WU) have been pushing Steve and Bill to have a forage base of cisco." Armacost is a middle-aged, friendly sort, whose demeanor belies a fishing fervor. About 10 years ago, this former president of the Great Falls WU chapter switched from a dedicated fly-tying trout fisherman to walleye and lures: "If it's in the Cabela's catalog, I've used it."

Don Karcewski, also of Great Falls, and one of the original members of the town's WU group, is a more vocal FWP critic. "We saw the fishing going downhill," he says, "and we asked ourselves if the fishery was ever going to recover."

In 1996, armed with data that indicated Tiber's walleyes were not growing sufficiently, Leathe and Hill decided the water body did indeed need better forage. They plan to stock five million cisco fry in Tiber this spring. How Leathe and Hill came to that conclusion was a classic tug-of-war between interest groups wanting action and fisheries biologists, who also want good fishing but without train wrecks. "Introductions of naturally reproducing fish into large water bodies are irreversible," Leathe says. "You'd better be sure it's the right thing to do."

This cisco story really began 40 years ago when the Bureau of Reclamation completed Tiber Dam and created 17,000-acre Tiber Reservoir. Along with flood control and irrigation came a chance to angle for fish not native to Montana's high plains: rainbow and lake trout, perch, walleye, and northern pike. FWP stocked walleyes in Tiber from 1971 through 1974. "I probably put the first walleyes in there," says Hill, who started working on Tiber in 1969.

The goal was a self-sustaining sport fishery that would depend on yellow perch, which were very abundant, as a forage base. It worked. Walleye became the dominant fish by the mid-1970s, peaking in 1977. But by the late 1980s Hill found walleye declining in size and body condition. The blame lay with dwindling perch and sucker populations as a result of walleye and northern pike predation and fluctuating

water levels, especially the latter. "Forage has always been a concern because of fluctuating water levels," Hill says.

Perch need vegetation or submerged structures, such as trees, to string their eggs on. When water levels are not stable, vegetation has a hard time surviving. So do perch.

In 1984, Tiber received spottail shiners, minnows that grow to four or five inches. They were a limited success, as they provided steady forage along the shoreline. But their numbers peaked in 1991, declined to a low in 1993, and have stabilized since at higher levels.

"In 1992, a lot of fishermen started to notice you didn't see spottail shiners anymore," Karcewski says, "either along the shore or on our depth finder screens. What walleye you did catch, there'd be nothing in their stomachs."

Actually, Hill kept finding good numbers of spottails in shoreline seine hauls, but the small fish posed another problem. Size of prey seems to be a limiting factor for walleye growth: bigger fish need bigger food. Spottails mostly help walleye younger than 2 years old.

As walleye growth first slowed, then declined, and biologists searched for a new forage base, anglers demanded action—and results like those in Fort Peck Reservoir. Fort Peck sits astride the Missouri River in eastern Montana. In the late 1970s and early 1980s walleye growth in the reservoir was poor. FWP fisheries workers planted cisco in the spring of 1984. Within two years, the average weight of Fort Peck walleyes started a long climb that lasted seven years.

Seeing an apparent walleye-cisco success in the east, walleye anglers wanted a repeat in central Montana. "In Tiber we have plenty of walleye," Armacost says, "but they just don't have any class. They're 14-inch fish."

Despite the pressure in Great Falls, anglers in Shelby and Cut Bank greeted the cisco planting idea with skepticism. "We've never been displeased with the size of our walleye," says Mike Alford of Shelby, former president of that community's WU chapter. A self-described river rat, Alford has fished the Marias River and Tiber Reservoir since the 1970s. "So what if the fish were a little small," he says. "Everybody I know has at least one wall hanger. How many do you need?"

When comparing Fort Peck with Tiber, Leathe and Hill noted several differences that concerned them: Fort Peck does not have a self-sustaining walleye population, the fish have to be stocked. "Tiber has excellent reproduction," Hill says. "Fort Peck does not."

They wondered if cisco in Tiber would eat the same microscopic creatures—zooplankton—that young walleye depend on for the first few days of life. "Tiber is less fertile than Fort Peck," Leathe says. A water body is less fertile when it has lower phosphate and nitrogen levels, which translate into lower zooplankton levels. That leads to fewer, and often smaller, predator and prey fish.

The worry over cisco eating walleye food was eased when the biologists discovered that several Canadian lakes with zooplankton levels lower than Tiber's have healthy walleye and cisco populations. Yet, the anxiety of planting a non-native fish remains. "Without careful research, species introductions are a crapshoot," Leathe says. "Even with detailed scientific analysis, there are some unavoidable risks and unanswerable questions."

Leathe has tried to minimize the chance that introducing cisco would produce a disaster in Tiber. That meant taking time to look at more data from Fort Peck, asking other states and provinces for case histories of cisco introductions into naturally reproducing walleye populations, and checking the scientific literature.

In 1991, FWP contracted with a University of Idaho scientist to study the potential of putting cisco into Tiber. The 1993 report concluded the time was not right; cisco planting should be deferred until it was better justified. The Idaho researcher, however, did not have 1992 data available to him. Starting in 1992, walleye numbers in Tiber began to decline, and continued downward through 1994. Growth decreased in 1993 and 1994 but increased in 1995 and 1996.

To say some area walleye anglers disagreed with the report is to say fish live in water. "The fishery was suffering for years; it was going downhill," Karcewski says. "For three or four years we'd been talking to Steve Leathe. He contended there was no problem, and he would cite statistics from creel surveys. The fact still remained the fishery wasn't the same."

During the last three years, as angler complaints about Tiber mounted, Fort Peck biologists found troubling numbers in their nets. For a three-year period, 1992-1994, the average weight of female walleyes increased each year. In addition, the average number of walleyes caught in gill nets dropped.

Those numbers indicated a population of aging fish not being replaced. It had all the marks of a species headed for a crash, in a reservoir that had cisco planted on top of walleye. The turnaround came with Fort Peck's 1995 numbers: the percent of walleye over 20 inches dropped, and the number of walleye caught in gill nets increased. In other words, young walleye were on the increase in Fort Peck. The risks of putting cisco into Tiber had dropped to the acceptable range.

In February, FWP received about five million cisco eggs from Canada. The fry will be stocked later this spring, and next fall biologists will attempt to learn if any of the cisco survived. Now all parties—critics, skeptics, and biologists—are hoping for the best. "I think it will turn into the premier fishery in Montana," Armacost of Great Falls says. "The fishing will be more exciting, and probably Tiber will be more crowded. The word will get out."

That's precisely what worries Alford, although he cautiously backs the plan: "I think the only thing it's going to do is take pressure off other walleye reservoirs. I can't see why they want to turn it into a trophy reservoir."

Though he's taken heat for not acting quickly enough, Leathe remains unshaken. "Taking a slow and deliberate approach to species introductions into major waters like Tiber is, in my opinion, one of the hallmarks of sound and responsible fisheries management."

THE LOCHSA STORY: LAND ETHICS IN THE BITTERROOT MOUNTAINS, by Bud Moore, Mountain Press Publishing Co., P.O. Box 2399, Missoula, MT 59806 (1-800-234-5308); 1996, 475 pages, soft cover, $20.00.

Bud Moore brings his intimate knowledge of the Lochsa country and a lifetime of experience as a land manager to bear in examining man's impacts on this rugged mountain region along the Montana-Idaho border. His narrative breathes life into the Native Americans, explorers, trappers, prospectors, firefighters, and forest rangers whose stories make up the Lochsa's colorful history. Moore, who concluded a distinguished 40-year career with the U.S. Forest Service in 1974, spent his boyhood and early manhood exploring, trapping, and working as a forest ranger in the Lochsa. His perspective, which spans a period that saw much of the region transformed from pristine wilderness to a multiple-use area, offers valuable insights into the ethics of land management on western forests.

TO HECK WITH MOOSE HUNTING, by Jim Zumbo, Wapiti Valley Publishing Co., P.O. Box 2390, Cody, WY 82414 (1-800-673-4868); 1996, 208 pages, hard cover, $17.95 plus $4 shipping.

In this sequel to *To Heck with Deer Hunting* and *To Heck with Elk Hunting*, Jim Zumbo recounts a lifetime of moose hunting adventures as well as hunts for goat, sheep, antelope, caribou, and other big game. The settings vary from the northern reaches of the continent (Alaska, British Columbia, Quebec, Newfoundland, Baffin Island) to the Rocky Mountain states of Colorado, Utah, Wyoming, and Montana. There is also a chapter on hunting in Africa. The book describes harrowing incidents—like crossing 80 miles of arctic ocean in a freighter canoe—as well funny events, strange happenings, and the mixture of successes and failures that are the lot of big game hunters everywhere. Zumbo's stories are genuine and entertaining, and contain some instructional material as well.

DABBLERS & DIVERS: A DUCK HUNTER'S BOOK, Willow Creek Press, P.O. Box 147, Minocqua, WI 54548 (1-800-850-9453); 1996, 160 pages, hard cover, $39.95 plus $4.00 shipping.

To capture the mystery and romance of the duck hunter's world, the editors of *Ducks Unlimited* selected 100 outstanding color pictures depicting all facets of the sport and matched them with quotes from waterfowling legends like Nash Buckingham and Gordon MacQuarrie. The birds, the marshes and rivers at dawn, the stormy skies, the retrievers, and the diversity of boats, blinds, and decoys used by hunters across the country are all included in this artistic blend of text and photos. *Dabblers & Divers* is a tribute to both waterfowl and the millions of hunter-conservationists who have fought to preserve and perpetuate them as part of North America's wildlife heritage.

THE ART OF WILD GAME COOKING, by Eileen Clarke and Sil Strung, Voyageur Press, P.O. Box 338, Stillwater, MN 55082 (1-800-888-9653); 1995, 128 pages, hard cover, $24.95 plus $2.95 shipping.

As the authors point out, the art of wild game cooking is not only in preparation of the meals, it's in the care and handling of game and understanding which meats and cuts are best suited for different recipes. A section devoted to big game includes valuable tips on skinning, cooling, hanging, and aging the carcass, and chapters on small game and fish provide equally good advice on care and handling from field to kitchen. But the heart of the book lies in the more than 100 recipes for everything from elk, deer, and antelope to duck, grouse, pheasant, trout, and salmon. The book is illustrated with color photos of many of the dishes described as well as photos of game species and hunting scenes.

BEAR AWARE: HIKING AND CAMPING IN BEAR COUNTRY, by Bill Schneider, Falcon Press Publishing Co., Inc., P.O. Box 1718, Helena, MT 59624 (1-800-582-2665); 1996, 128 pages, soft cover, $6.95.

This pack-sized, 4 x 6-inch book is a handy reference for hikers, campers, anglers, mountain bikers, and hunters—in short, anyone recreating in bear country. It contains good information on grizzly and black bear behavior and tips on choosing campsites, hanging food, and securing garbage out of the reach of bears, and using noise and pepper spray as bear deterrents. While no one can predict with certainty how any bear will behave or prescribe a sure-fire way of coping with every threatening situation, Montanan Bill Schneider has drawn on 30 years of experience in bear country and an exhaustive review of the literature to produce an easy-to-read reference that will make your outings safer and more enjoyable.

THE GIFT OF TROUT, edited by Ted Leeson, a Trout Unlimited book published by Lyons & Burford, Publishers, 31 West 21 Street, New York, NY 10010; 1996, 180 pages, hard cover, $25.00.

The Gift of Trout is a collection of stories and essays from fly-fishing luminaries like John Gierach, Tom McGuane, Datus Proper, Nick Lyons, Roderick Haig-Brown, and others. The book leads off with David Quammen's fine essay, "Synecdoche and the Trout," which should be required reading for all trout anglers. Other selections address trout fishing history, fly-fishing literature, ethics, habitat improvement, and conservation. Scattered throughout are stories that describe trout fishing from coast to coast. Eighty-five percent of royalties from sale of the book go to Trout Unlimited, an organization devoted to preservation of wild trout and habitat.

MARMOTS HITCH RIDES WITH PARK VISITORS

I enjoyed John Vore's Watchable Wildlife article on marmots and their habits [Sept./Oct. 1996]. Over the years spent in Waterton-Glacier International Parks and the prairies to the east, I have noted another characteristic of both whistling and yellow-bellied marmots, and that is hitch-hiking.

Marmots spend much time basking, and this is all well and good until cool, cloudy, or rainy days come along, even in summer in marmot country. What has happened, for example, is that whistlers along Going-to-the-Sun Highway have climbed up into the engine compartment of parked cars in order to bask in the warmth of the heat radiating from the engine and are reluctant to leave.

In one documented case a whistler near Logan Pass ran across the highway to a yellow Buick and disappeared. No one thought much about that and the car soon left, and without stopping was driven to Roes Creek, also known as Rising Sun. The occupants' picnic was soon interrupted by a piercing whistle from under the car hood, which startled the owner and passengers into action since they assumed the car had developed some strange malfunctions. Up went the hood, and there was the marmot, unhurt by its ten-mile ride.

It took much discussion to decide to dislodge the marmot right then and there, rather than to go the ten miles back to Marmotville and have to explain possibly to both tourists and rangers what was going on. It took four people with sticks and loud voices to finally dislodge the marmot and back the car away quickly before the marmot caught another ride.

In another instance, a rancher on the St. Mary River prairies stopped early one cool morning at his fencepost pile, loaded posts, then saw a yellow-belly run under his pickup and disappear. The rancher drove five miles on into town amidst various marmot shrieks coming from under his truck.

The truck was put up on the hoist at the high school metals shop where a number of enthusiastic students eventually dislodged the marmot and captured it in a five-gallon pail. After a day spent entertaining students in the biology room, the marmot was taken back to its post pile and released.

Another story emerged of a whistler being seen a hundred miles from its normal home in the mountains, this being a highly improbable natural range extension and a bafflement to science, and now accounted for by the verification of marmot hitch-hiking. —*Keith Shaw, Fairfield*

LEND A HELPING HAND

I read with great appreciation and understanding Alan Charles' article on good hunter/landowner relationships [Nov./Dec. 1996]. It is advice that should be heeded by us all. However, I did have a difference of opinion with one statement. Mr. Charles states that "...if we do stop by and find the landowner busy, instead of expecting him to stop what he's doing to accommodate us, maybe we ought to leave and try somewhere else, or plan to come back another time." Perhaps a better idea would be to offer the landowner your assistance. Most Montana landowners I know are single family businesses that can ill afford hired hands. Come out and help the rancher at branding time or the farmer at harvest. You might have a valuable learning experience while enjoying the great outdoors. I've seen most every species of animal native to Montana prairies from the seat of a tractor during haying season or the saddle of a horse at roundup. I have family on Rosebud Creek, and I eagerly await my annual journey north. Whether it's hunting or helping with the ranch, I truly enjoy being under the Big Sky.—*Vance L. Woodard, Powderly, Texas*

DON'T ALIENATE YOUR SUPPORTERS

I'd like to respond to the Minnesota woman who wrote in your November/December issue [Readers Respond] that she objected to photos of dead animals. Your response correctly pointed out that a majority of subscribers are hunters and anglers, and the photos were a means to preserve cherished memories. How right! I recently let lapse my subscription to *Outdoor California*, the California Department of Fish and Game's official publication. Why? Because the magazine contains next to no information of interest to a hunter/fisherman. Lots of cutesy photos of birds and bees, the obligatory monthly hunter-as-criminal article, and little else! I don't blame Fish and Game because in California it is politically correct (read necessary) to kow-tow to the animal rights wackos. Hence a magazine that alienates its main supporters, and has anemic subscription numbers to show for it.

Incidentally, I just renewed to your excellent publication for the longest period offered—3 years. Keep up the high standards. If you publish this letter and the Minnesota gal reads it, she should know *Ranger Rick* is always an option.—*Ben Berto, San Anselmo, California*

TREASURE STATE MEMORIES

Just a note at renewal time to say how much I have enjoyed your publication through the years.

Although a California native myself, my father was a native of Missoula, we both graduated from MSC (now MSU) '29 and '58, and I was stationed at Malmstrom AFB (Great Falls) from 1967-73. During those years, I hunted, fished, and boated in the "Treasure State" (now "Big Sky Country").

Many good friends and good times remain!

Thank you again for presenting the Lord's blessings to the public through photographs and journalistic essay.—*R.W. Danielson, Jr., Merced, California*

Contributors

All animals talk, says Sam Curtis—their lives depend on it. But it is often a language that only animal researchers can translate. Dogs, wolves, deer, and other animals use smells, sounds, and gestures to communicate, while many insects emit chemicals called pheromones to send messages to others of their kind. To learn more about the fascinating ways in which wild creatures communicate, turn to "Animal Talk" on page 2. Curtis is a free-lance writer based in Bozeman.

Paige

Brown-headed cowbirds lay their eggs in the nests of other songbirds, leaving the job of rearing the young to the unwitting hosts. Prior to European settlement, when cowbirds followed herds of roaming bison, this unusual behavior posed no problem. Today, however, nest parasitism is adversely affecting many songbird species. In "Tracking Down an Avian Trickster" (p. 8), Christine Paige describes a fascinating study of cowbirds and their impacts on other birds in the Bitterroot Valley. Paige, who lives in Missoula, is a wildlife biologist and free-lance writer with many years in bird conservation.

Montana's largest native trout—the bull trout—has declined over much of its range. As part of a grassroots conservation effort, "watershed groups" made up of ranchers and concerned citizens are working to restore their numbers in drainages throughout western Montana. In his article beginning on page 14, John Fraley describes these groups and some of the work they have undertaken, and tells how they fit into the state's overall bull trout restoration program. Fraley is FWP's information officer for Region 1 in Kalispell.

Victor artist Joe Thornbrugh's painting of a golden retriever and drake mallard has won the 1997 Montana waterfowl stamp contest. According to FWP information officer William Phippen, Thornbrugh won the stamp's inaugural competition in 1986 as well as the 1990 and 1991 contests. For a look at Thornbrugh's winning entry, as well as the second and third place paintings by Jim Borgreen of Lewistown and Wayne Dowdy of Polson, turn to Phippen's article on page 21.

In this issue's "Lands Legacy" installment, Gayle Joslin tells how the conservation ethic of two Helena-area families is "Linking Prehistory to Posterity" (p. 23). Since the late Pleistocene, wildlife have moved north and south in what is now Montana along a corridor stretching from Glacier National Park to the Gates of the Mountains Wilderness. Within this area, large tracts of wilderness, several wildlife management areas, and private preserves have formed the backbone of a remarkable wildlife recovery. Now,

Joslin

thanks to three new conservation easements, habitat protection and public access have been guaranteed for a sizeable area in the corridor's southern end. Joslin is an FWP wildlife biologist stationed in the Helena Area Resource Office.

In Mike Gurnett's family—as in many Montana families—fishing is more than recreation—it connects the

Gurnett

generations. As he writes of his late father in "Soul Music" (p. 27), "Fishing was what he and his boy did together." While Gurnett was growing up, the two fished as often as possible on Big Spring Creek, just a few miles from their home in Lewistown. "Dad would hand me a couple of extra flies and send me upstream to the prime water....It must have been something, watching me in the riffle his father had put him in," he recalls. Gurnett, who is FWP's film production supervisor stationed in Helena, now fishes with his own children and hopes that when they grow up "they will think of the banks of the upper Missouri and they will want to be there."

MO thanks the following artists and photographers for their contributions to this issue: Alison Banks, Milo Burcham, Erick Greene, and Chris Paige, Missoula; Erwin & Peggy Bauer and Tim Egan, Livingston; Daniel J. Cox, Phil Farnes, and Rich Kirchner, Bozeman; Michael H. Francis, Billings; Lisa Harvey and John Lambing, Helena; Larry Javorsky, Hamilton; Ron Jenkins, Charlo; Donald M. Jones, Troy; Lee Kaiser, Kalispell; Bill Marchel, Fort Ripley, MN; Alan G. Nelson, Great Falls; W. Steve Sherman, Dillon; and Paul Updike, Townsend. Thanks also to the following contributors who work for the department: John Fraley, Kalispell; Mike Gurnett, Dave Hagengruber, Gayle Joslin, and Craig Jourdonnais, Helena; and Don Peters, Missoula.